Limiting Losses from Other Tuber Rots

Potato Pest Management Workshops
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Outline
- Some other tuber rots of concern are:
  - Bacterial Ring Rot
  - Pink Rot
  - Pythium Leak
- We’ll discuss these topics for each disease:
  - Causal Agent
  - Symptoms
  - Disease Cycle
  - Factors Favoring Disease Development
  - Scouting Tips
  - Disease Control Strategies

Bacterial Ring Rot
- BRR is caused by Clavibacter michiganensis subsp. sepedonicus (Cms), a tuber-borne bacterium that can be spread during seed cutting, handling and planting
- Wounds are ideal infection sites for Cms
- Infection of seed is favored by wet soil conditions and temperatures of 17-22°C
- Cms survives in/on infected tubers, crop residues and contaminated surfaces
- A declared pest under Alberta’s Agricultural Pests Act and Regulation

Disease Cycle

Factors Favoring Disease Development
- Cms becomes established in large xylem vessels and causes blockages (biofilms)
- Symptoms are pronounced in dry soil and at temperatures of 24-32°C
- Foliar symptoms may be suppressed during cool, moist growing conditions or when fields are heavily fertilized and irrigated
- Cms can be spread mechanically, especially during seed cutting and planting and by insects (aphids and potato beetles)
Factors Favoring Disease Development

- Expression of symptoms is affected by:
  - Pathogen concentration in the plant/tuber
  - Potato cultivar
  - Strain of Cms
  - Growing conditions for the potato crop
- Plants and tubers with latent infections can remain symptomless for several generations
  - Extensive field inspections and lab testing for BRR is carried out during seed production and there is a zero tolerance for this disease at every stage

Foliar Symptoms

- Leaf margins curl up tightly and may become necrotic
- Yellowing of interveinal areas are clearly visible

Foliar Symptoms

- Bacterial ooze can sometimes be squeezed from the cut surface of a potato stem infected with ring rot, i.e. “milking” the stem

Foliar Symptoms

- Some potato cultivars develop a rosette-type symptom when infected with ring rot, which is characterized by shortened internodes

Tuber Symptoms

- Tuber symptoms generally occur in the vascular ring of tubers, hence the name “Ring Rot”

Tuber Symptoms

- Bacterial ooze can sometimes be squeezed from the vascular tissue of severely infected tubers
Tuber Symptoms

- External tuber cracks may be a symptom of BRR infection

Scouting for Bacterial Ring Rot

- Start looking for BRR symptoms by carefully examining seed tubers for signs of decay, especially during seed cutting
- Inspect fields on a regular basis, especially close to harvest
- Monitor tubers for symptoms on the harvester and during grading
- Check storages for evidence of tuber decay and associated odors

Disease Control Strategies

- Plant disease-free, certified seed tubers
- Sanitize storages, seed cutters, planters, handling equipment, diggers and trucks
  - General Storage Disinfectant, SaniDate, 1-Stroke Environ, Bleach
- Manage cull piles and BRR-infected tubers
- Rotate potatoes with non-host crops, such as cereals, canola and pulses
- Control volunteer potatoes and solanaceous weeds in all fields on potato farms

Pink Rot

- Caused by Phytophthora erythroseptica
- Related to late blight (Phytophthora infestans)
- Pink rot and late blight often occur together
- Late blight infection can pave the way for secondary tuber infection with pink rot
- Abundant rainfall or heavy irrigation in the spring and early summer promote infection
- Pink rot is more aggressive in tubers than late blight and is more resistant to drought and cold
- Freezing the tubers may not kill pink rot

Tuber Symptoms

- Infected tissues have a rubbery texture
- Cut surfaces turn salmon-pink then black when cut and may exude a clear liquid
- Foliar symptoms may include aerial tubers, marginal leaf burn, chlorosis and leaf drop
- Below-ground stem and root rot may also occur

Pink Rot Symptoms
Factors Favoring Disease Development

- Moderate to high temperatures (20-30°C)
- Tuber decay is greatest at 25°C
- Soil saturation, poor drainage and excessive irrigation or rainfall
- Significant wounding of tubers
- Abundant soil inoculum
- Infected tubers going into storage
- Susceptibility: whites > russets > reds

Disease Control Strategies

- Select well-drained fields
- Apply foliar or post-harvest fungicides, e.g., Ridomil Gold/Bravo, Phostrol or Rampart
- Avoid excessive irrigation
- Minimize tuber wounding during harvest
- Delay harvesting until pulp temperature is between 7 and 10°C
- Grade out infected tubers going into storage
- Lower temperature and humidity if rot develops in storage

Scouting for Pink Rot

- Check wet areas in the fields for symptomatic plants (tops and roots) as crops near maturity
- Check tubers for pink rot symptoms during harvest, bin filling/unloading and cull piles
- Look for signs of water running from beneath piles of potatoes in storage
- Cut affected tubers and look for pink coloration developing in ca. 30 minutes
- Test symptomatic tubers with a Phytophthora (late blight) test kit

Pythium Leak

- Caused by Pythium ultimum
- Pythium is common in agricultural soils and has a broad host range
- Pythium is a ‘water mold’ and requires abundant soil moisture in order to cause disease
- In potatoes, Leak affects only the tubers
- The disease can progress rapidly in the field and in storage
- Can cause seed piece decay
Pythium Leak

Disease Cycle
- Overwintering oospores germinate and infect tubers through wounds
- Infection develops steadily under warm temperatures but slowly under cool temperatures
- Some infected tubers may rot in the field while others are harvested and go into storage
- Leaking tubers can promote bacterial soft rot in storage

Factors Affecting Disease Development
- Wounds on tubers from planting, harvesting and handling operations
- Favored by warm temperatures (25-30° C)
- Severe losses can occur when bruised, immature tubers are harvested during hot, dry weather
- Cut seed pieces are vulnerable to infection if wound healing is delayed

Scouting for Leak
- Check harvested crops for symptomatic tubers
- Check cull tubers for leak symptoms during harvest and bin filling/unloading
- Cut symptomatic tubers and look for internal decay and a watery discharge
- Squeeze affected tubers to see if the tissue is spongy and wet and smells sweet
- If tubers smell putrid, then bacterial soft rot has already set in

Disease Control Strategies
- Follow a 3-4 year crop rotation
- Don’t spread infected cull tubers back onto potato fields
- Delay harvesting until skins are well set
- Avoid bruising at harvest and at other stages of handling
- Don’t harvest when soil temperatures are high
- Cool warm tubers going into storage
- Apply Ridomil Gold/Bravo as a foliar spray

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