

# Bacterial Soft Rot: New Name. New Pathogen? New Problem?

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## A New Threat to Potato – “*Dickeya solani*”

***Dickeya* species: an emerging problem for potato production in Europe** (Toth et al., 2011)

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**Potato farmers fear dickeya disease will wreak havoc in UK**

(The Grocer, 2009)

# Overview

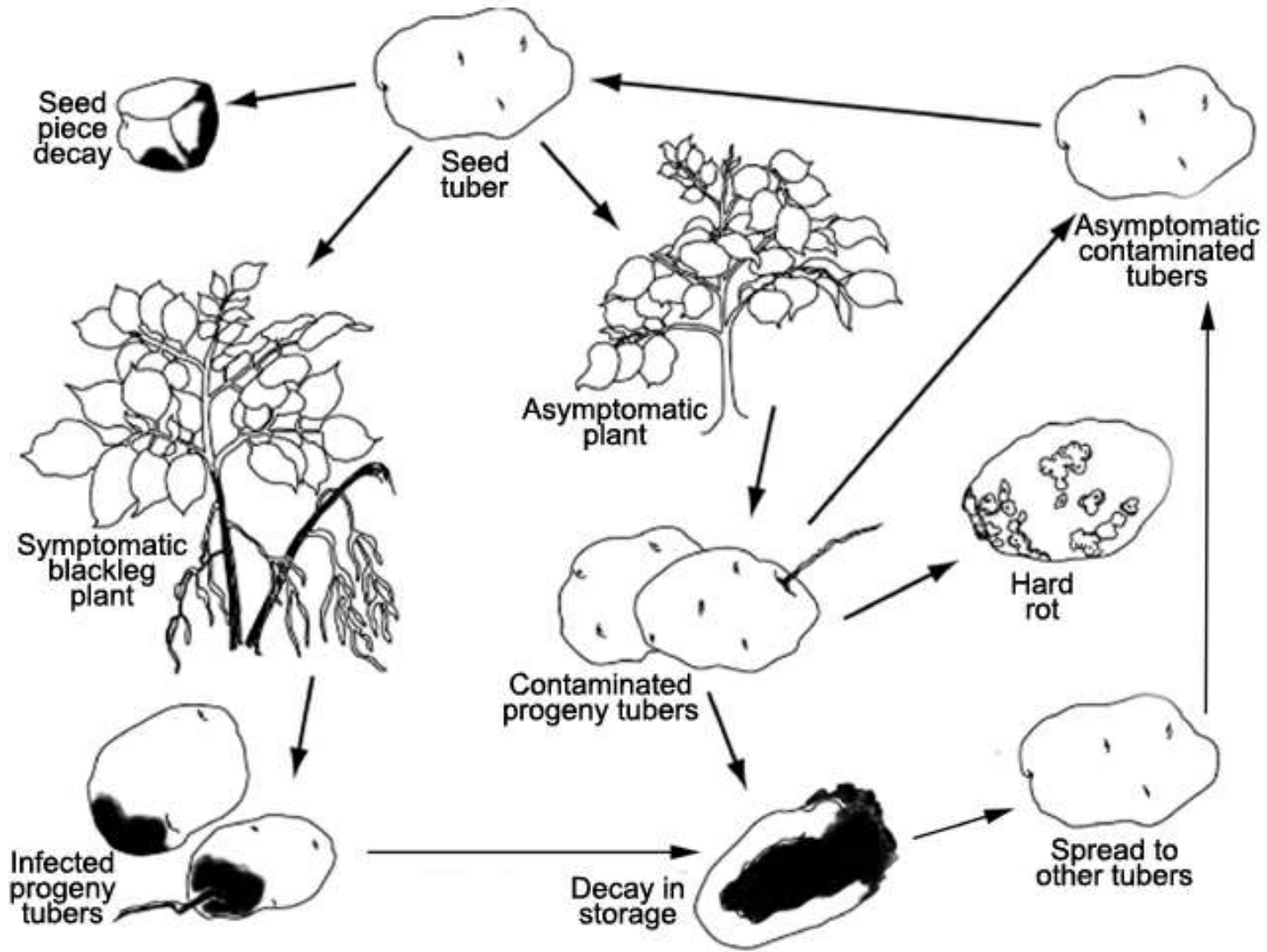
- Bacteria causing blackleg, aerial stem rot and soft rot
  - Disease cycle and symptoms
  - *Erwinia*, *Pectobacterium* and *Dickeya*
  - Why the concern: legitimate or hype?
- Management practices



# Blackleg, Aerial Stem Rot & Tuber Soft Rot

- These diseases are very similar and the different names generally indicate where the disease occurs
  - Blackleg and aerial stem rot affect the vines during the growing season
  - Aerial stem rot does not originate from the seed piece
  - Tuber soft rot affects tubers in the field and during storage and transit





Potato Blackleg Disease cycle

Courtesy V. Brewster

# Symptoms

- Progresses from seed piece up into stem and foliage
- Black to dark brown water soaked lesions
- Wilt and leaf chlorosis



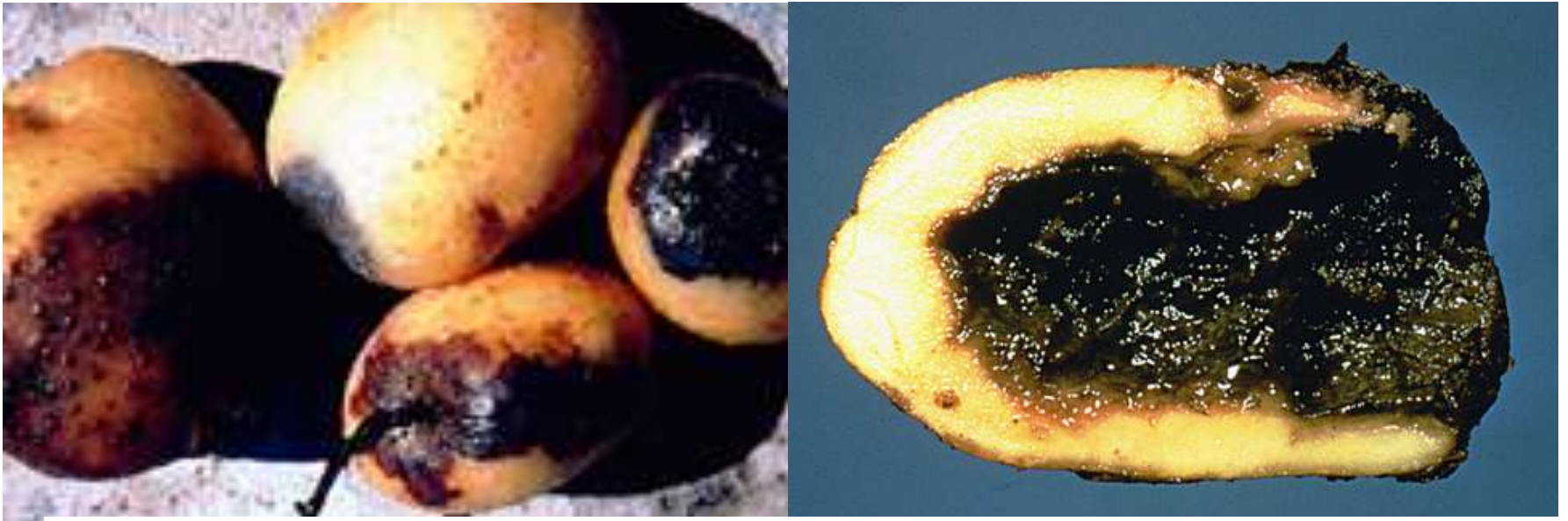
# Symptoms

The pith decays and this may occur without external symptoms



# Tuber Symptoms

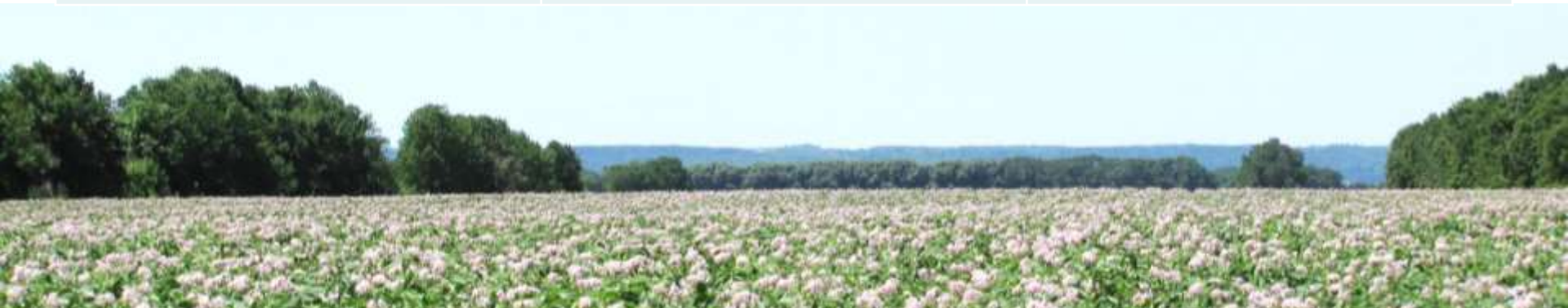
- Tubers get infected through the stolon or contaminated in the soil or storage
- Symptoms can range from vascular discoloration to complete decay
- May initiate at the stolon end, in the lenticels, or wounds





# Blackleg & Tuber Soft Rot Pathogens

Host	Old Name	New Name
Potato	<i>Erwinia carotovora</i> subsp. <i>atroseptica</i>	<i>Pectobacterium atrosepticum</i>
Potato & other crops	<i>Erwinia carotovora</i> subsp. <i>carotovora</i>	<i>Pectobacterium carotovora</i> subsp. <i>carotovorum</i>
Potato, corn, chrysanthemum	<i>Erwinia chrysanthemi</i>	<i>Dickeya dianthicola</i> <i>Dickeya solani</i> Other <i>Dickeya</i> spp.



# ***Pectobacterium* & *Dickeya* spp.**

- Both of these pathogens cause similar wilt and decay symptoms in plants and tubers
- The symptoms are often indistinguishable
- Pathogen “behavior” is different. *Dickeya* spp.:
  - Can initiate disease with less inoculum
  - Has greater ability to spread through vascular tissue
  - More aggressive
  - Higher optimum temperature for disease

Toth et al. 2011. Plant Pathology 60: 385-399



# ***Pectobacterium & Dickeya***

- *Dickeya* appears to be less hardy in the soil and outside of plants compared to *Pectobacterium*
- Unlikely that *Dickeya* can overwinter freely in soil

Toth et al. 2011. Plant Pathology 60: 385-399



# *Dickeya* spp.

- There are multiple species of *Dickeya*
- The first report in potatoes was from the Netherlands and most early findings were of *D. dianthicola*
- A more aggressive strain emerged in the mid- 2000's and was named *D. solani*



# Status in North America

- From 2007 – 2009 DeBoer et al. conducted a survey to identify the pathogens associated with bacterial stem rot in Canada
- Results indicated that the predominant pathogen isolated from infected stems and tubers was *P. atrosepticum*
- Two isolates were presumptive positive for *Dickeya* spp., but further testing confirmed they were not *D. solani* (CFIA, personal communication)

DeBoer et al. 2012. Phytopathology 102: 937-947.



# Status in North America

- Not aware of any more recent Canadian blackleg surveys
- While the incidence of blackleg can fluctuate from year to year, there are no reports of significant occurrence and losses due to blackleg
- In Canada, the CFIA Seed Certification Program has strict tolerances for blackleg and this may be largely responsible for limiting the incidence of blackleg in the industry



The standards for certification of all classes of seed are set out in Sections 47.11 - 47.8 of the seed regulations. The maximum levels of detectable disease on the final inspection of the growing crop for the main commercial classes are summarized below:

<b>Disease</b>	<b>Elite 3</b>	<b>Elite 4</b>	<b>Foundation</b>	<b>Certified</b>
Bacterial Ring Rot	0.00%	0.00%	0.00%	0.00%
Potato Spindle Tuber Viroid	0.00%	0.00%	0.00%	0.00%
Total All Viruses	0.20%	0.30%	0.50%	2.00%
Total of Blackleg, Wilts and Viruses	0.30%	0.50%	1.00%	2.00%
Varietal Mixtures	0.05%	0.10%	0.20%	0.50%



# Status in North America

- In recent years there have been some severe losses in the eastern US resulting from seed decay caused by *D. dianthicola*
- This occurrence has created much discussion and concern about *Dickeya* and the potential impact that it could have on the industry
- Seed Certification Programs in the US do not have established tolerances for blackleg





# Legitimate Concern or Hype?

- Need to be aware of the risk and be proactive in order to prevent the introduction and establishment of any new disease threats, including *Dickeya* spp.

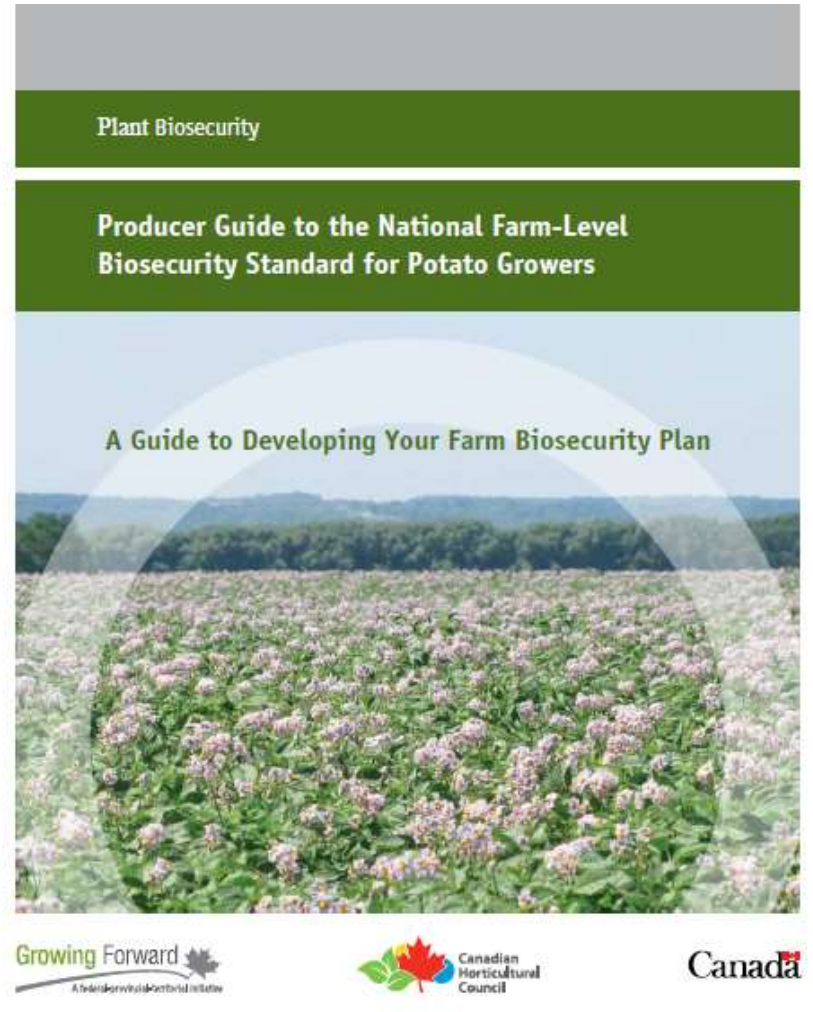
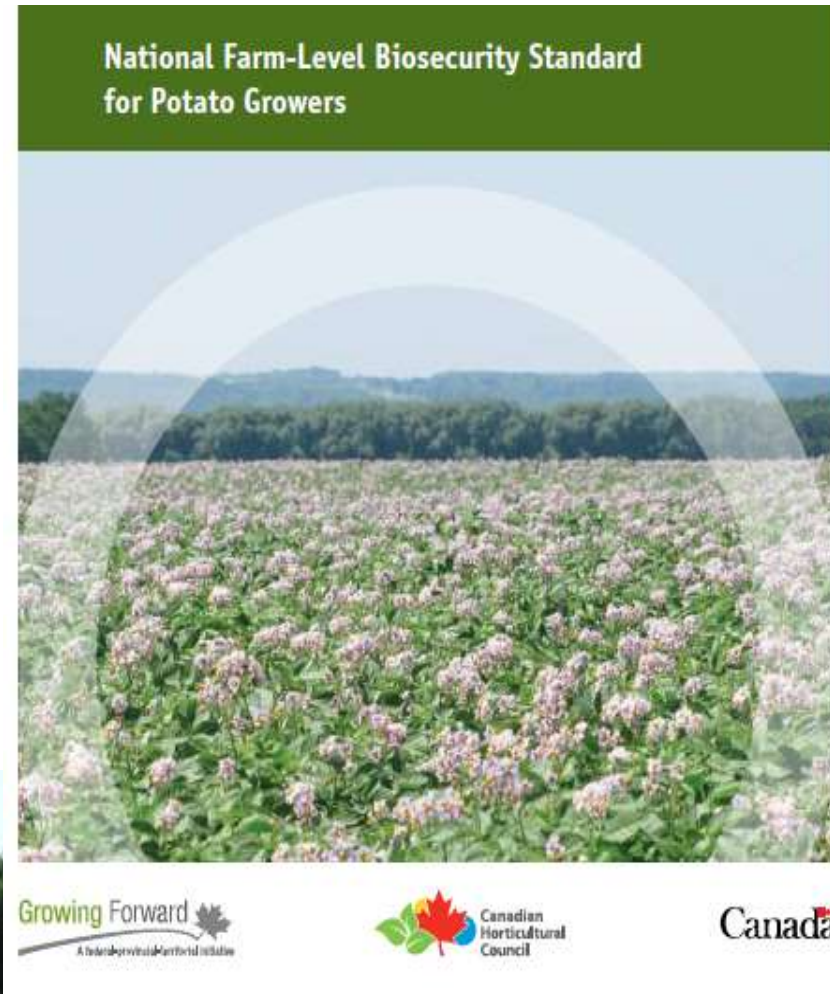


# Management Practices

- Follow best practices for management of bacterial diseases
- Use clean seed
- Clean and disinfect seed cutting and handling equipment
- Plant seed that is well suberized, and into well drained soil 10 – 13°C
- Handle tubers to minimize bruising and wounding
- Store tubers with good air flow, humidity, and as cool as possible



# Resources for Biosecurity BMP's



# Conclusions

- Blackleg and tuber soft rot can be caused by a few bacterial pathogens
- Emergence of a more aggressive pathogen
- These pathogens may “behave” differently and can be very difficult to distinguish by field symptoms
- Management strategies are the same
- Be aware of the risk and always follow biosecurity BMP's





**Questions?**

# Woman says she found bugs in her Wendy's baked potato: "I was instantly disgusted"

POSTED 7:20 PM, JANUARY 24, 2016, BY [KATIE DELONG](#), UPDATED AT 07:21PM, JANUARY 24, 2016

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