

Tracking Dickeya in North America

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EAPR

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Introduction

- My friend and colleague Solke DeBoer, told me before he retired, to “watch out for chrysanthemi” and he was right – now Dickeya has exploded in North America and become the hot topic in the potato world
- Our intention is to talk some about our experience with the pathogen and the disease it causes in North America
 - History
 - Movement
 - Actions
 - Detection
 - Screening
 - Spread
 - Management

History

- Dickeya identified as *E. chrysanthemi* sporadically in NA for several years; 15 US states; worldwide distribution
- Documented in potatoes from Florida and Ontario in 2014; a first for me
- By 2015 widespread distribution in potato crops in eastern US causing substantial losses
 - One large crisp grower lost U\$1.5 million due to stand losses caused by Dickeya
 - A small tablestock grower lost her crop two years in a row





History

- Testing showed that *Dickeya* was present in samples from 11 US states and one Canadian province
 - All identified as *D. dianthicola* by researchers
 - No other species of *Dickeya*
 - Identity confirmed by USDA-APHIS-CPHST (Center for Plant Health Science and Technology)
- Most, if not all, samples came from fields planted with seed potatoes produced in ME
- Backtracking showed *Dickeya* caused blackleg likely in early generations and on basic seed farm in Maine
- US certification meeting in November 2015 discussion on *Dickeya*
 - National Potato council appointed a national *Dickeya* task force

Actions

- Maine Potato Board engaged the services of Scottish colleagues to provide information on the biology and management of *Dickeya*
 - Gerry Sadler and Greig Cahill
 - Very much appreciated the teachings, the experience and the protocols
 - National webinar
 - Focus on Potato presentation

Focus on Potato



Dickeya: A Scottish, UK and
European Perspective
May 2016

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Watch Presentation (39 min 37 sec) for PC,
Mac, and Mobile Devices | for
iPhoneSubscribe to PMN

Actions

- Seed lot testing winter 2015-2106
- Basically three labs testing – Maine, Wisconsin, North Dakota
 - 200 cores/seed lot, pelADE primers to detect, speciate by MLSA or FLIc primers
 - Again all dianthicola, except chrysanthemii in Hawaii winter grow out test site
 - Dickeya found in many seed lots including new locations
 - NB, MI, WI
 - 95% accurate
 - The politics of Dickeya science increased, especially in Maine, became contentious
 - Sampling continues from fields in 2016



Distribution of Dickeya in North America 2016



Actions

- May 2016 APHIS sends a memo to state agricultural regulatory officials
- Classifies the potato blackleg pathogen *Dickeya dianthicola* as a non-reportable/non-actionable pathogen
- APHIS will not conduct survey, regulatory or control activities
- Will establish a *Dickeya* technical working group
- Much talk and debate about the role of certification for blackleg caused by *Dickeya*

Observations

- Undoubtedly Dickeya is spreading with seed potatoes
- Evidence of spread by seed cutting
 - EU does not cut seed
- Little evidence of field spread
 - Charkowski testing of adjacent plants
- ...but continued increase of Dickeya during growing season in commercial fields

Dickeya dianthicola weekly count in commercial potato fields in Florida 2016

Total plants counted per visit: 900

Field	Grower	Variety	Lot/Bin #	Week 1			Week 3			Week 3			Week 4			Week 5		
				DAP	"Sick" Count	%	DAP	"Sick" Count	%	DAP	"Sick" Count	%	DAP	"Sick" Count	%	DAP	"Sick" Count	%
Jackson 3			5 LH	50	23	2.56	56	71	7.89	64	94	10.44	70	91	10.11	85	109	12.11
Taylor			5 LH	44	16	1.78	51	73	8.11	58	73	8.11	65	77	8.56	80	134	14.89
Brown			5 and 6 LH	42	4	0.44	47	17	1.89	55	63	7.00	62	77	8.56	77	142	15.78
Koon 4			R.Way Field	46	20	2.22	55	73	8.11	63	64	7.11	77	147	16.33	83	208	23.11
Koon 4			5 and 6 LH	46	41	4.56	55	72	8.00	63	94	10.44	77	147	16.33	83	203	22.56
Koon 3			#5 Little Rd and 9 Wiley Rd	41	5	0.56	46	44	4.89	56	39	4.33	70	101	11.22	76	147	16.33
Koon 3			R.Way Field	41	10	1.11	48	43	4.78	56	67	7.44	70	125	13.89	76	205	22.78
Milton 3			#9 Wiley Rd	38	3	0.33	45	8	0.89	52	21	2.33	72	86	9.56			0.00
Suw. 26			#5 Little Rd and 9 Wiley Rd	37	1	0.11	42	21	2.33	50	31	3.44	66	65	7.22	71	157	17.44

Average

1.5

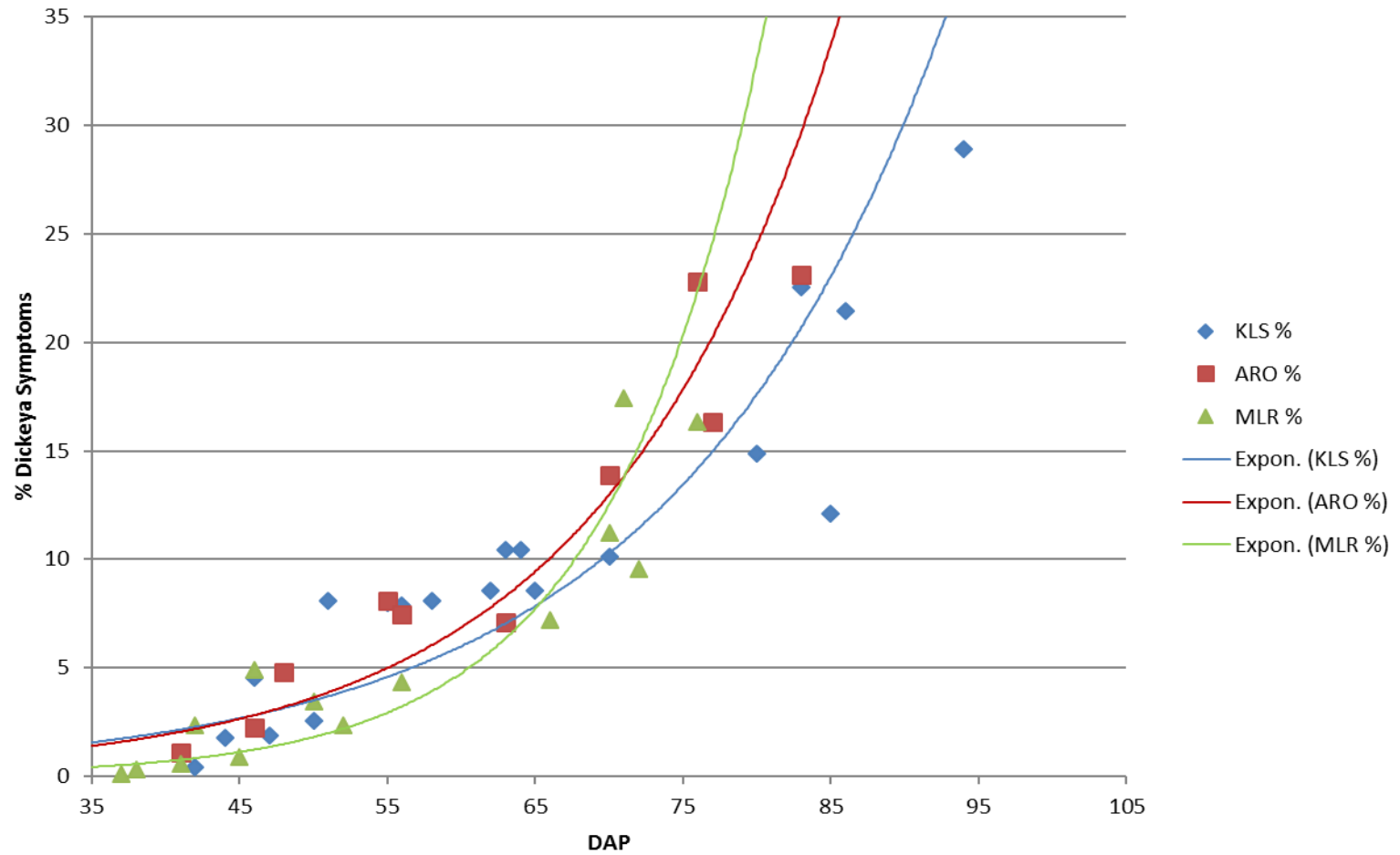
4.4

6.7

11.3

15.3

Evolution of Symptomatic Dickeya over time

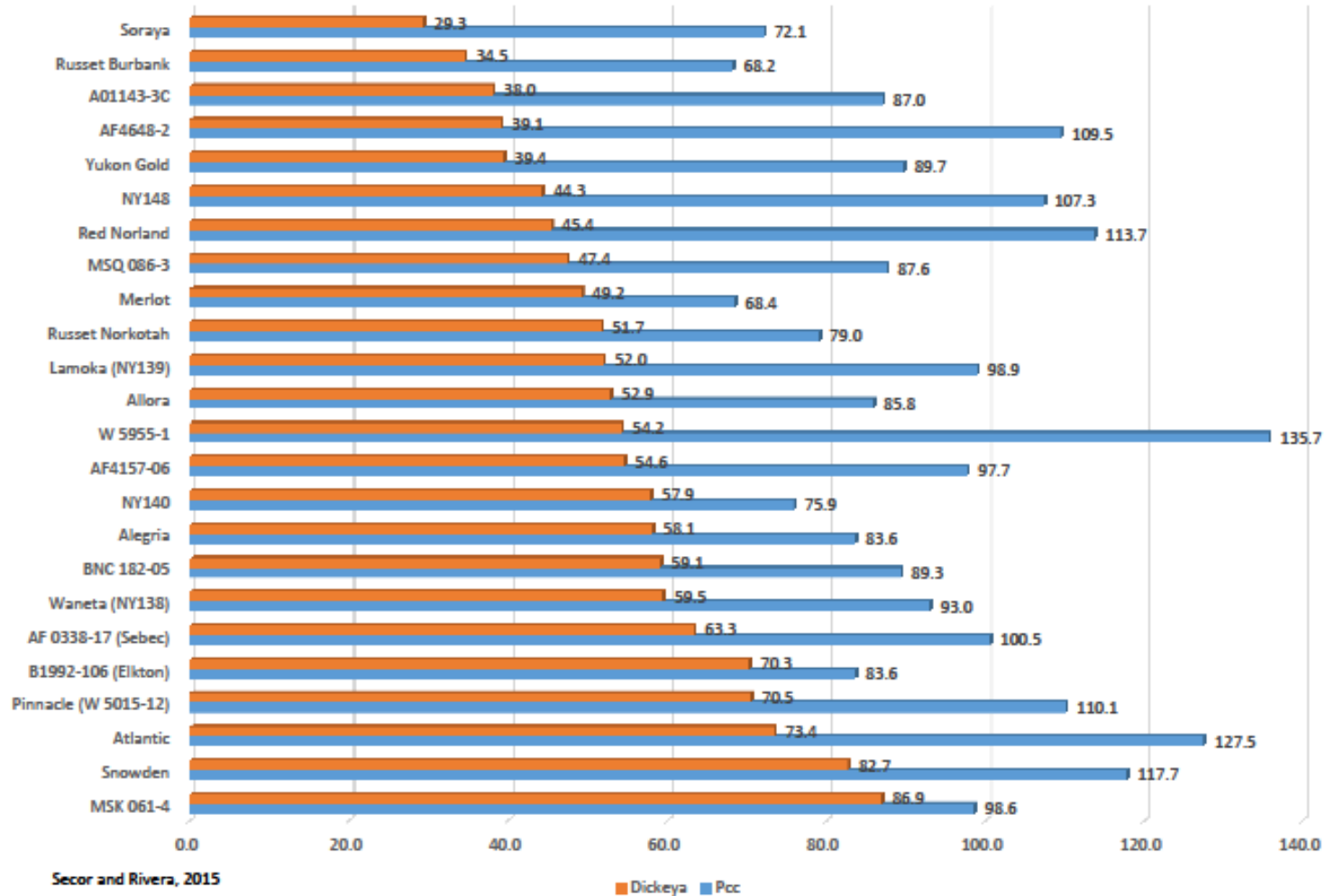


Management

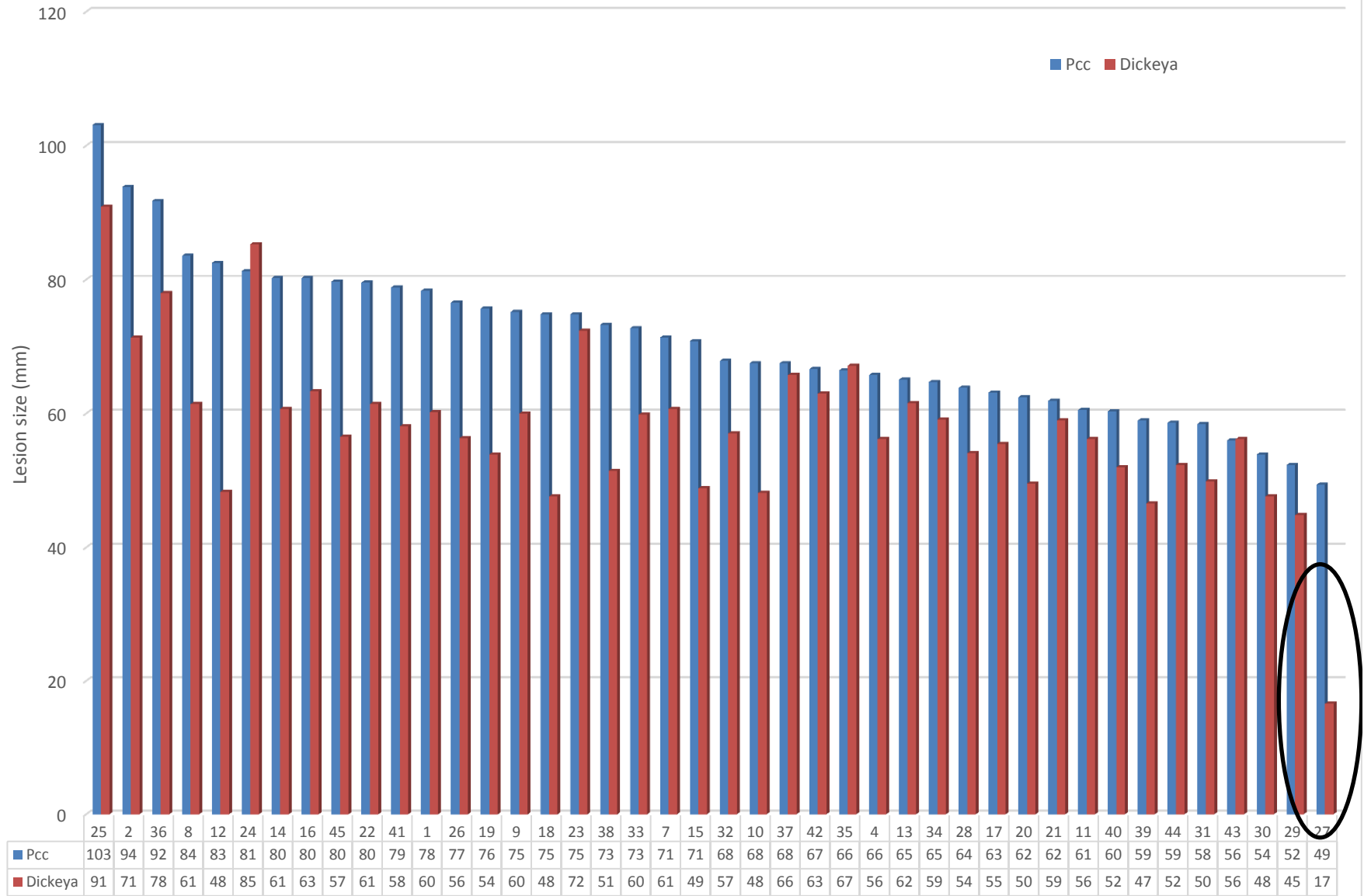
- Can we use results from a study we conducted with *Pectobacterium* seed decay to help manage *Dickeya* decay?
 - Handling and cutting of seed at 12C has less decay because of faster wound healing compared to 10C
 - Managing *Fusarium* indirectly manages *Pectobacterium* decay because *Fusarium* acts as an entry site for *Pectobacterium*
 - *F. sambucinum* is resistant to TBZ and fludioxonil in NA
 - There are differences among varieties



Susceptibility of USPB clones to soft rot caused by *Dickeya* and *Pectobacterium* in 2015



Susceptibility of tubers from a population of potato clones to Pectobacterium and Dickeya



Clone #

Secor and Rivera NDSU 2016

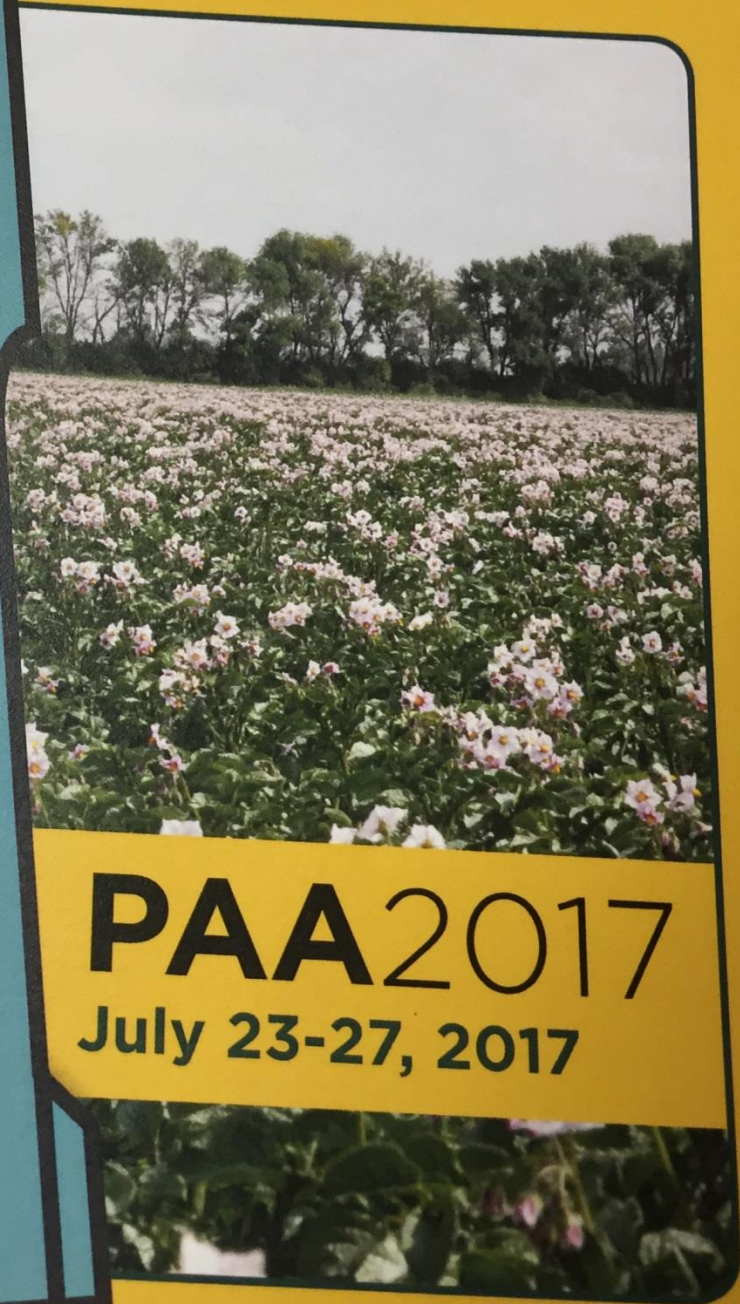
Management Options: The Big Four

- Exclusion: quarantines; seed lot testing, certification
- Eradication: eradicate infected seed lots, treat water with (my favorite) ClO_2 , disinfect seed handling and planting equipment
- Resistance: Not readily available?
- Protection: disinfectants, copper, biologicals?

What we need to know

- Spread
- The source of Dickeya
 - Other hosts – *D. dianthicola* has a huge host range
 - Water – surface, well, document, research priority
 - Limited testing in US, but some positive samples from water
 - NFT/hydroponic minituber production systems??
- Seed certification – another huge issue
 - Blackleg not currently part of certification in the US
 - Should it be?
 - What tolerances?
 - Different for Pectobacterium v Dickeya?
 - Seed lot testing
 - Latent infections, testing protocol, sample size, logistics
 - Legal issues

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