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BACTERIA CAUSING BLACK LEG – A CHANGED PICTURE IN SWEDISH POTATO PRODUCTION

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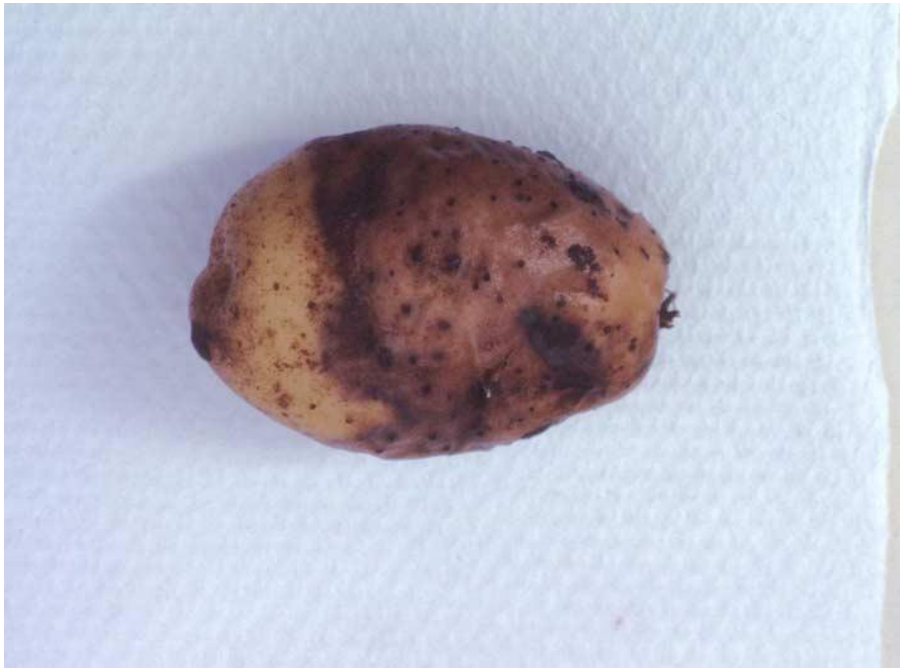
Survey in the 1980s

Black leg

Aerial stem rot



Soft rot

BLACK LEG

P. atrosepticum

AERIAL STEM ROT

P. atrosepticum
P. corotovorum

SOFT ROT

P. atrosepticum
P. corotovorum

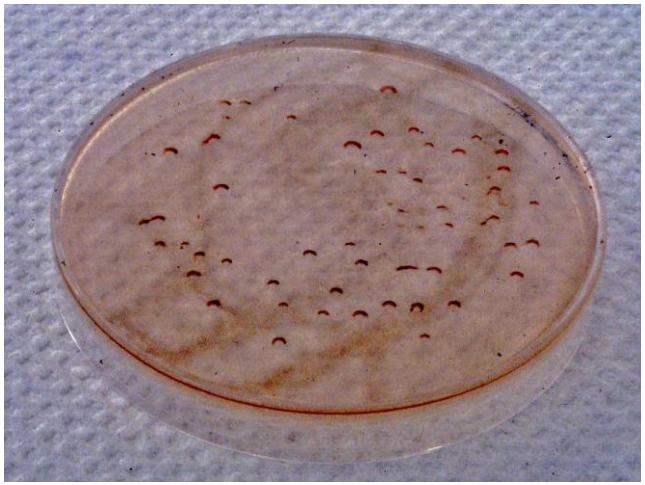
(Persson, 1988)

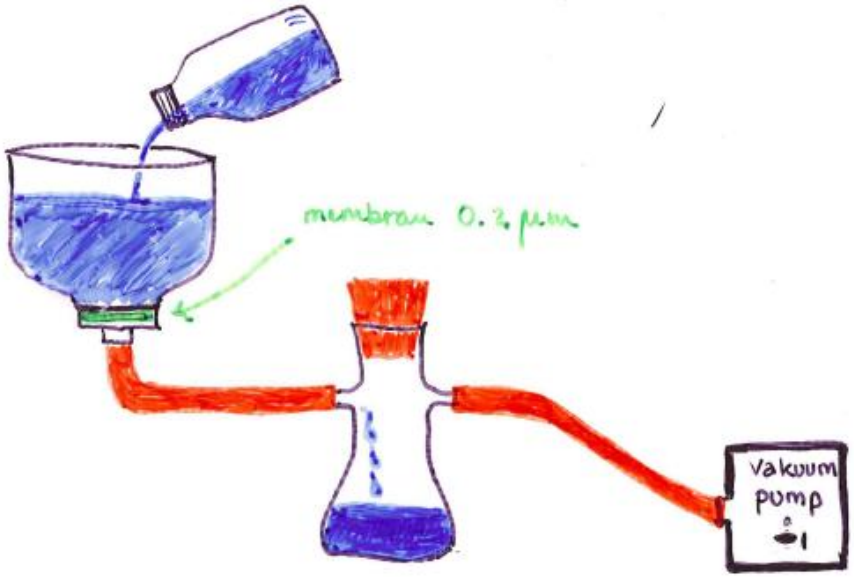
Pectolytic *Pectobacterium* and *Dickeya* in water

- Drainage water
- Streams
- Rain
- Sea Water
- Rivers
- Lakes
- Snow

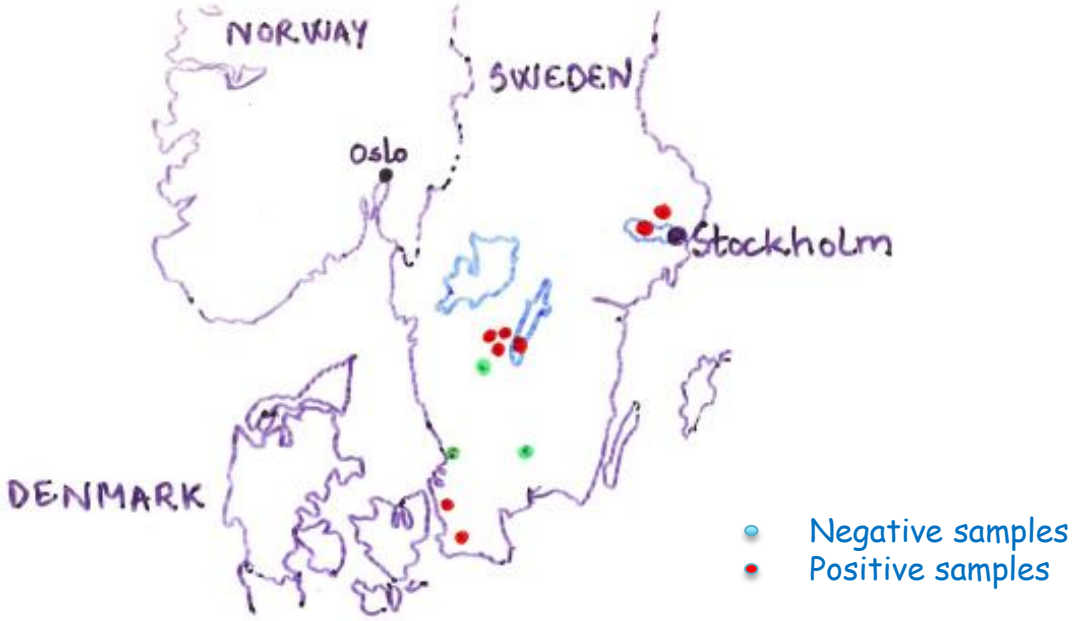
> 95% *Pectobacterium carotovorum*

Pectolytic bacteria in surface water



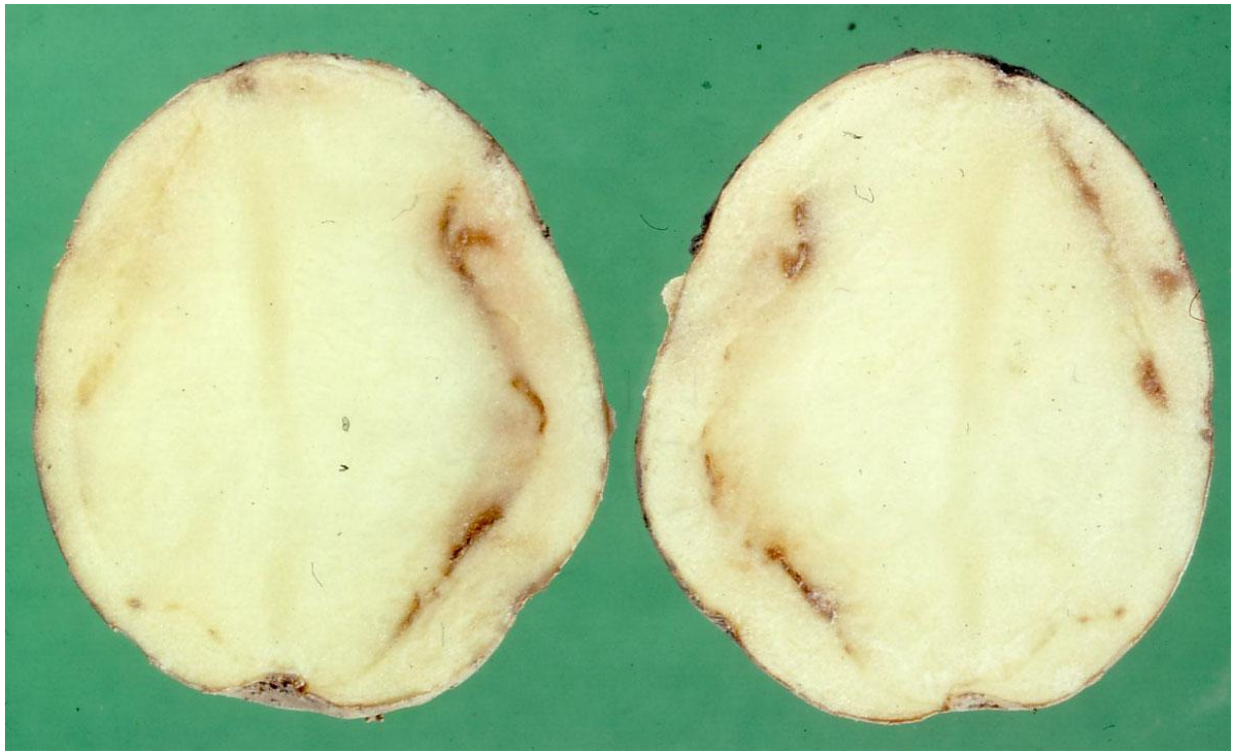


Crystal Violet Pectate medium



	P. artrosept	*P. carot.*	*Dickeya. sp*
Water reservoir	-	++	-
Stream	-	++	+
Lake	-	++	+

(Persson, 1991)



Progeny tuber field symptoms of *Dickeya* sp. (*Erwinia chrysanthemi*) using seed tubers inoculated with isolates from surface water in Sweden (Olsson, 1983)

Erwinia chrysanthemi ⟶ *Dickeya spp.*

- *Attacking meny plant species:* potatoes and ornamentals

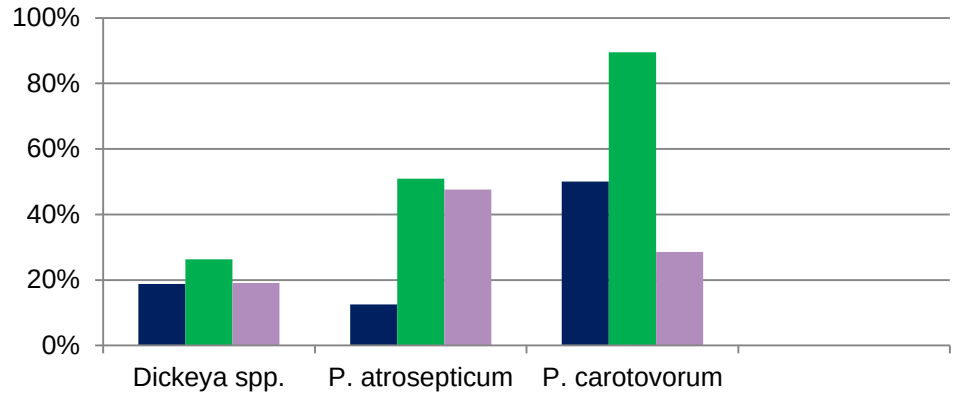
- 2005 a new genus : ***Dickeya*** devided into 6 species

Most common in potatoes ***D. dianthicola***

- 2010 new ***Dickeya*** detected in the Netherlands, Finland, UK ⟶ ***Dickeya 'solani"***

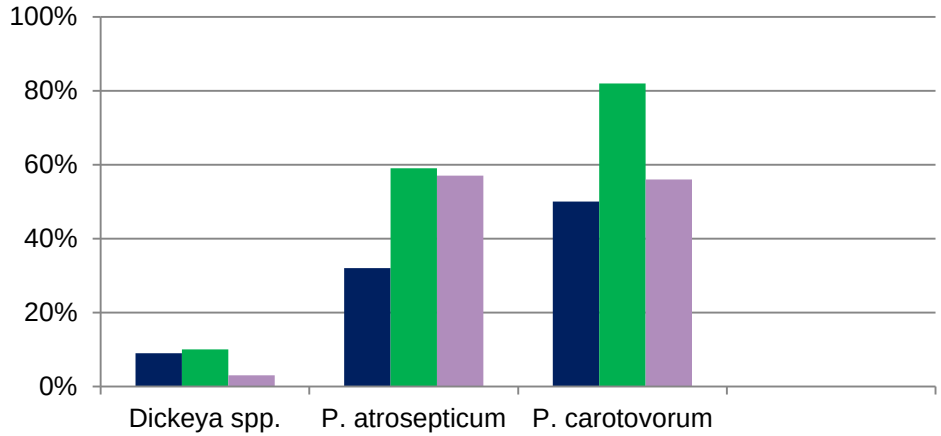
Latent tuber infections analysed from 2010-2012 harvests

	2010	2011	2012
Analyses by NAK	54	115	39
Analyses by MTT	39	9	0
Total no.	**93**	**124**	**39**
Certified seed	76%	87%	88%
Farmers seed	8%	9%	10%
Consumtion	16%	5%	2%



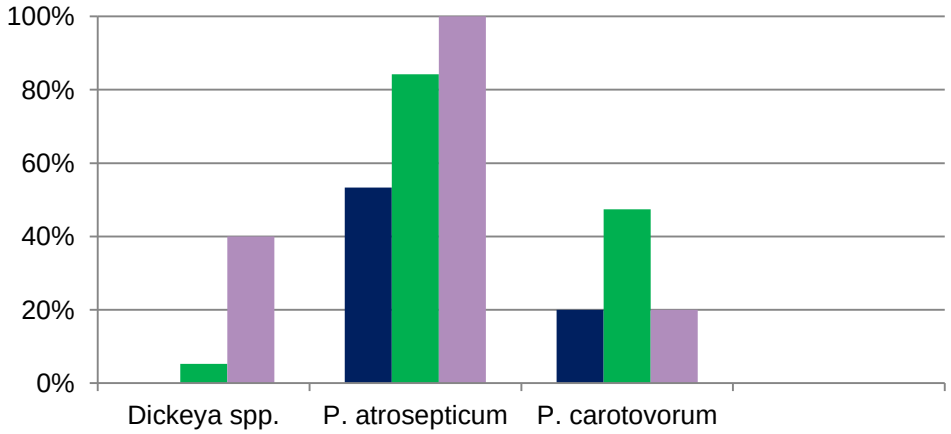
2010

- Imported seed (n=16)
- Background import (n=57)
- Swedish origin (n=21)



2011

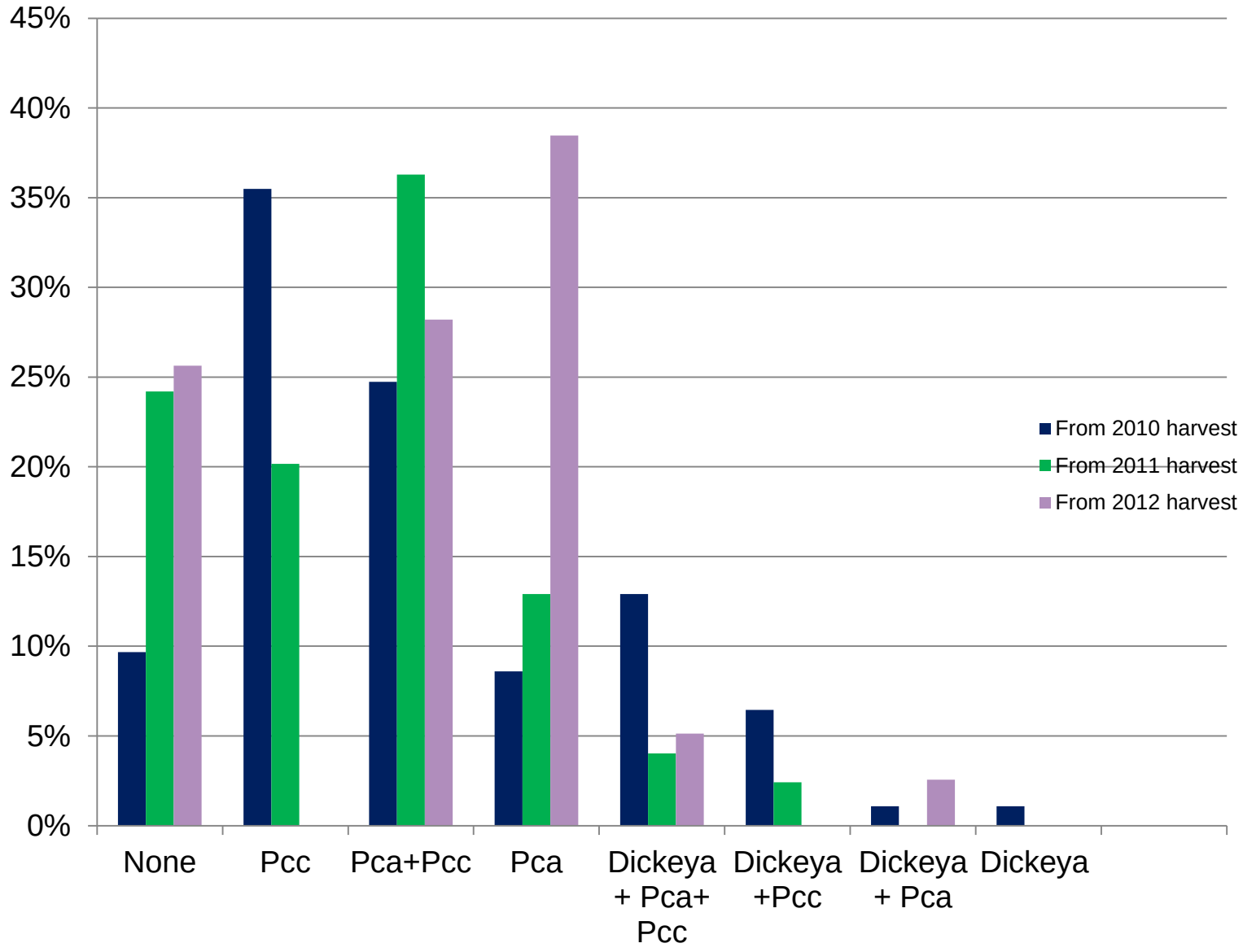
- Imported seed seed (n=22)
- Background import (n=39)
- Swedish origin (n=65)



2012

- Imported seed (n=15)
- Background import (n=19)
- Swedish origin (n=5)

% of samples with different black leg bacteria



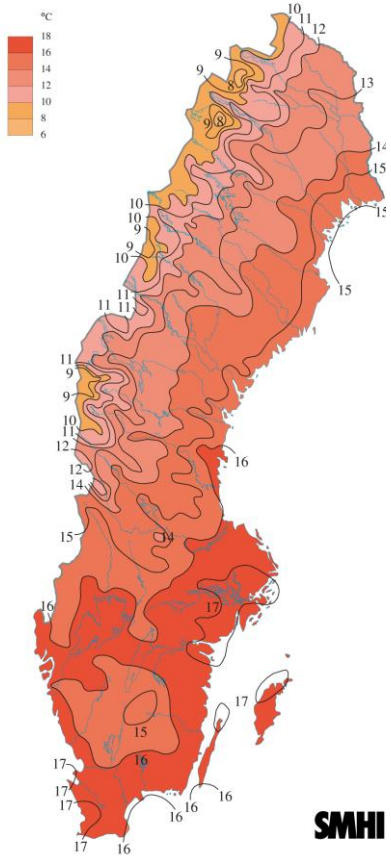
	2010	2011	2012
Total amount of analyses	93	124	39
Positive for *P. atrosepticum*	47%	53%	74%
Positive for *P. carotovorum*	80%	63%	33%
Positive for Dickeya sp.	22%	7%	8%
- *Dickeya solani*	65%	63%	34%
- *Dickeya dianthicola*	10%	25%	66%
- *Dickeya* sp.	25%	12%	

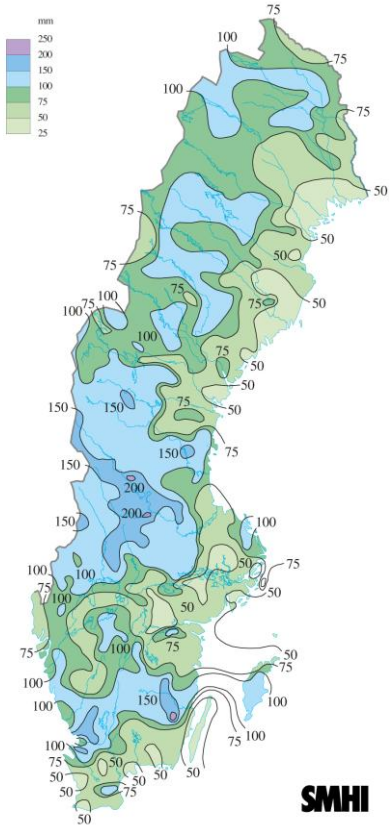
Do latent *Dickeya* spp. tuber infections develop black leg symptoms in Swedish climate?

Survey in the field 2012 and 2013

SLU

July 2012
Wet

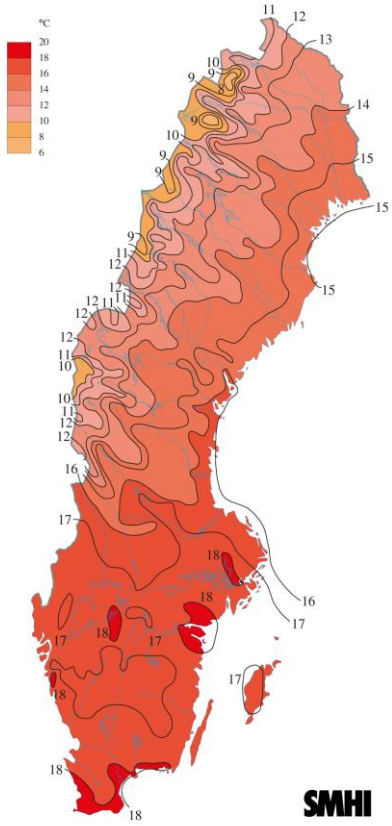


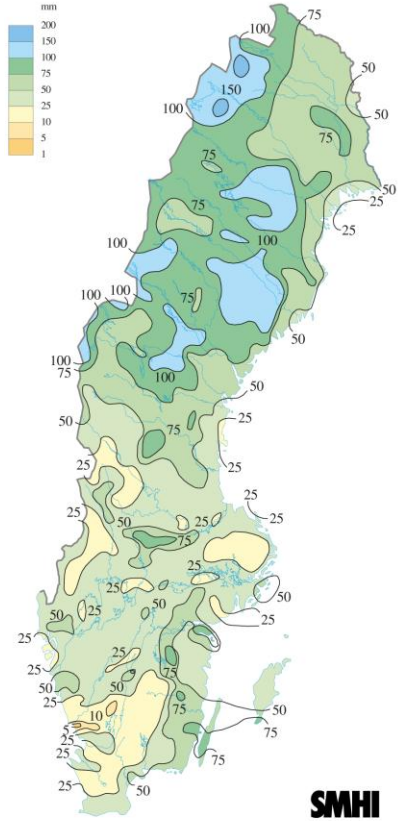


Temperature

Precipitation

July 2013
Dry





2012 and 2013 stems with black leg symptoms were collected.
PCR analasys using *Dickeya solani*, *D. dianthicola* and *Pectobacterium atrosepticum* specific primers

	2012	2013
Total number of samples	58	45
fields	35	31
Precense of, no. of samples		
Dickeya 'solani'	30	3
Pectobacterium atrosepticum	25	35
D. dianthicola	1	1
D. 'solani'+ P. atrosepticum	9	3
D. dianthicola + P. atrosepticum	1	1

Cv.
Toluca
Dickeya
solani
2012

Cv. Challenger *Dickeya 'solani'* infection 2012

Cv. Gala *Dickeya 'solani'* infection 2012

Cv. Kardal, *D. dianthicola* infection 2013

Conclutions

- *Dickeya 'solani'* and to some extent *D. dianthicola are* present in Swedish potato production
- *P. atrosepticum* and *P. carotovorum* are the most common species
- Dual and tripple bacterial species in seed tubefs are common
- Both *Dickeya 'solani''* and *D. dianthicola* develop black leg symptoms. Dickeya black leg symptom development also the cool and wet season 2012
- Dual bacterial infections *P. atrosepticum + D. 'solani'* in black leg stems are common

Thank you for listening!