

# Project proposal 'Health and resilience of (seed) potato tubers between haulm destruction and harvest'

*Rik Peters, Bert Evenhuis, Jan van der Wolf, René van der Vlugt, Martin Verbeek & Viola Kurm*



# Between haulm destruction and harvest

Electrocution



Haulm flailing



Haulm burning



Haulm pulling

# Pathogens affected by haulm destruction

'Black leg' (soft-rot causing bacteria)

- *Pectobacterium brasiliense*
- *P. atrosepticum*
- *Dickeya solani*
- Etc....



Black scurf

- *Rhizoctonia solani* AG 3



# Pathogens affected by haulm destruction

Black dot

*Colletotrichum coccodes*



Silver scurf

*Helminthosporium solani*



# Pathogens affected by haulm destruction

Phytophthora of the tubers

*Phytophthora infestans*



Phytophthora of leaves

*Phytophthora infestans*



# Pathogens affected by haulm destruction

Potato Y-virus

*Symptom on tuber*

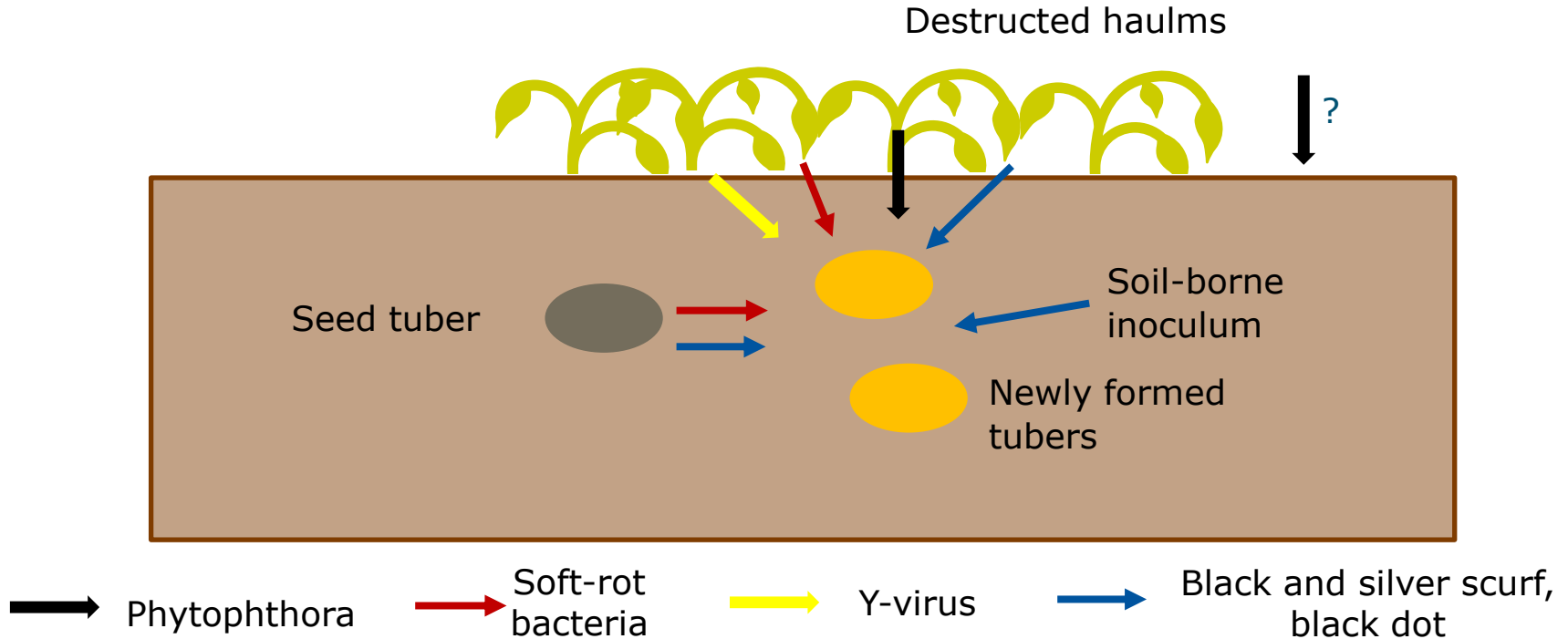


Potato Y-virus

*Symptom in foliage*



# Potential dissemination routes



# Project goal

- Gather information regarding the health and resilience of (seed) tubers during the period between haulm destruction and harvest based on:
  - Haulm destruciton method
  - Inoculum density
  - Soil type
  - Precipitation
  - Cultivar



# Research method soft-rot bacteria

## Treatments

- Haulm destruction method
- Cultivar and soil type

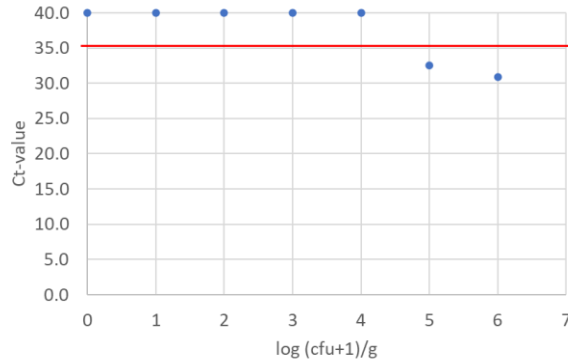
## Measurements

- Dissemination of *P. brasiliense* en *D. solani* from seed tuber and (dying) haulms
- Amount of precipitation and rotting speed of seed tuber (experimental research with traceable bacterial isolates)

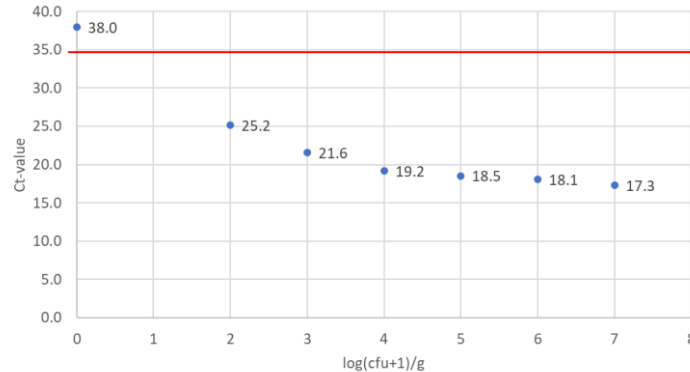
# Are molecular detection methods sufficiently sensitive?

## ■ *Pectobacterium brasiliense*

- Direct multiplex TaqMan assay (quantitative)
- Enrichment multiplex TaqMan assay (qualitative)



Direct: >10E4 cells/gram



Direct: >10E1 cells/gram

# Research method potato Y-virus

- Mechanical infection of potato tubers in the mesh greenhouse, measure translocation speed and % infected tubers
- Effect different Y-virus isolates
- Effect different time periods of haulm killing
- Effect different time periods between haulm killing and harvest
- Effect of haulm killing method

# Research method Phytophthora in tubers

## Treatments

- Different methods of haulm killing
- Different cultivars and soil types
- Precipitation
- Inoculum density
- With and without use of crop protection products

## Measurements

- Measure destruction of spores
- Measure development of new spores
- Measure level of tuber infection

# Research method storage diseases

## Treatments

- Different methods of haulm killing
- Different cultivars and soil types
- Precipitation
- Inoculum density
- With and without use of crop protection products

## Measurements

- Measure destruction of spores
- Measure development of new spores
- Measure level of tuber infection

# Development of diseases in storage

- Incubation to encourage expression of disease symptoms
  - Silver scurf
  - Black dot
  - Phytophthora in tubers
  
- Single storage treatment as to not introduce additional factors of data variation

# Soft-rot bacteria in following cultivation round

- (Enrichment) TaqMan assay to measure infection level of *P. brasiliense*
- Measure resilience of harvested seed tuber lots
  - Seed tubers from different haulm destruction methods are:
    - Inoculated with *P. brasiliense* or water (mock inoculation)
    - Planted in equal plots
    - Measure disease incidence

# Project results

Knowledge regarding infection risk of (seed) tubers between haulm destruction and harvest for:

- Soft-rot bacteria, Phytophthora, black scurf, black dot, silver scurf and potato Y-virus
- Several haulm destruction methods and time periods
- Different cultivars
- Several soil types
- Different weather conditions
- With and without crop protection products



# Deliverable

Decision tree to optimize choices for:

- Haulm destruction method
- Application of crop protection products
- Harvest method

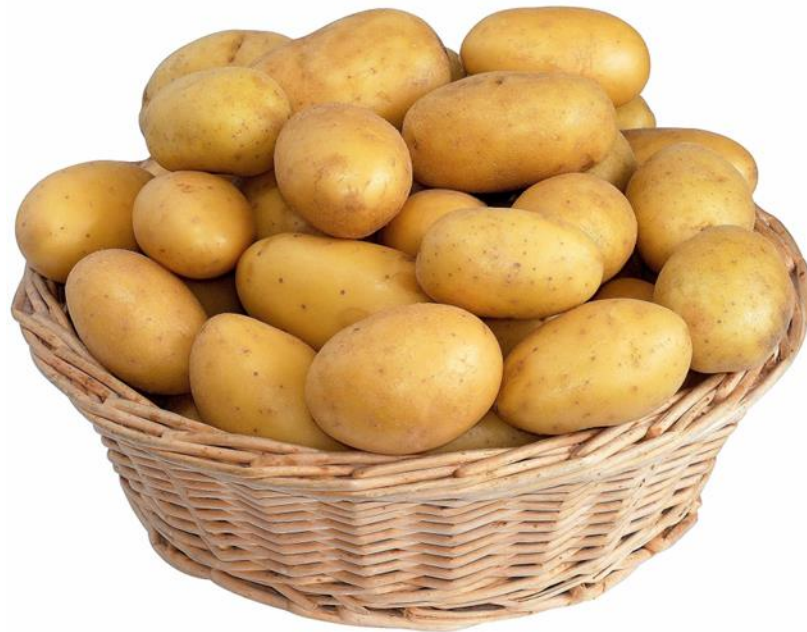
... Related to cultivar and weather conditions (namely precipitation)

# Potential project partners

- NAO-members
- BO-Akkerbouw (Dutch farmers association)
- Suppliers of haulm destruction machines/products
- Suppliers of crop protection products
- Agricultural extension services (advice)

# Thank you for your attention!

Any questions?



[Rik.peters@wur.nl](mailto:Rik.peters@wur.nl)

[Jan.vanderwolf@wur.nl](mailto:Jan.vanderwolf@wur.nl)

[Bert.evenhuis@wur.nl](mailto:Bert.evenhuis@wur.nl)

[Viola.kurm@wur.nl](mailto:Viola.kurm@wur.nl)