

### Seed decay, Soft rot and Black leg in Chile

- A survey done by INIA shows that 13.5% and 64.8% of the strains causing the disease are *P. atrosepticum* and *P.c. carotovorum*, respectively.
- Also, three seasons ago, one isolate was described as *P.c. brasiliense*.
- SAG also is performing a survey in 100 fields every year in the southern part of the country as a vigilance and phytosanitary control. They described mainly *P. carotovorum* on progeny tubers from black leg plants.

### Today...new production system...

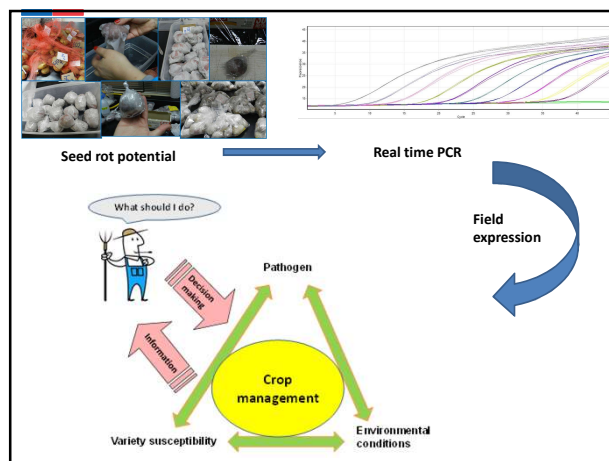
- Tuber seed (in vitro), new varieties
- Irrigation systems
- Mechanical harvesting
- Deficient storage facilities

Seed decay, soft rot and black leg

Losses of up to 30% on susceptible cultivars and rejection of seed lots up to 24%.

### Actual situation

- In addition, SAG in 2015, reported *Dickeya* spp. in potato crops in the VI Region and Metropolitan Regions. They described *D. dadantii*, *D. solani* and *D. dianthicola*. The fields are under official control and quarantine resolution (SAG, 2016).
- These results indicate that new bacteria are associated with potato causing black leg and soft rot, therefore, new studies need to be performed to have conclusive results.
- A proposal was granted by the Foundation for Agricultural Innovation of Chile (FIA).





**Main Objective:**  
Developing an integrated management strategy for potato bacterial diseases, based on a real time PCR assay as a seed rot potential to determine the sanitary risk and preventive measures.

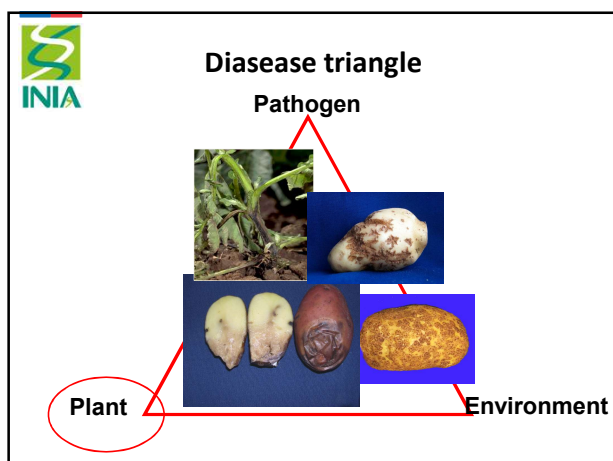
1. Develop a seed rot potential risk evaluation using real time PCR assay and correlated with soft rot and blackleg expression in the field.
2. Develop an integrated management strategy, based in the real time PCR seed rot potential and its field expression, according to the production system.
3. Determine the risk of bacterial disease expression according to bacterial tuber infection, variety susceptibility, agronomic management and environmental conditions.
4. Develop and implement a web page risk platform for potato bacterial diseases as a decision support system.
5. Extension and technology transfer

**3. Determine the risk of bacterial disease expression according to bacterial tuber infection, variety susceptibility, agronomic management and environmental conditions.**

Main risk factors of blackleg and soft rot expression will be determined:

1. Management farmer survey
2. Seed rot potential determination
3. Evaluation of field expression of blackleg and soft rot considering results of real time PCR assay, agronomic management, **variety susceptibility**, environmental conditions.

**Integrated management strategy** → Risk factors and their preventive management will be published on a platform as a DSS.



**Objective**

- To determine the variety susceptibility to soft rot on potato tubers, as a risk factor for the expression of the disease.

**INIA varieties**

Kuyu

Rayun

R16

R28

Karu

Patagonia

Puyehue

Yagana

Pukara

**Other varieties**

Rodeo


Asterix

Symfonia

Atlantic



## Methodology



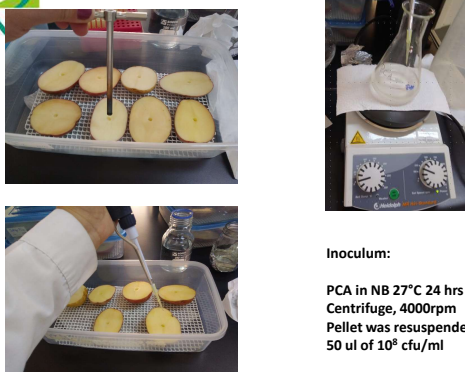
Ten tubers for each variety were wash and disinfected with a solution of 1% Sodium hypochloride.

Rinse and air dry overnight.

Cut in a half and put in boxes.

Tubers were inoculated

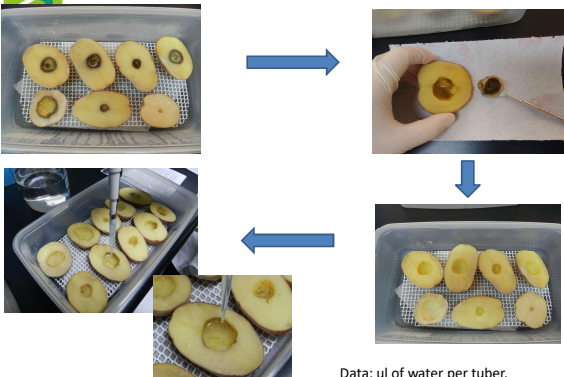
Incubated for 5 days at 27 °C



**Inoculum:**


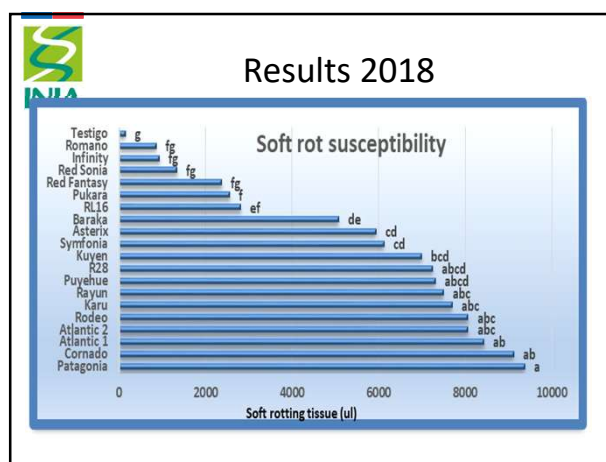
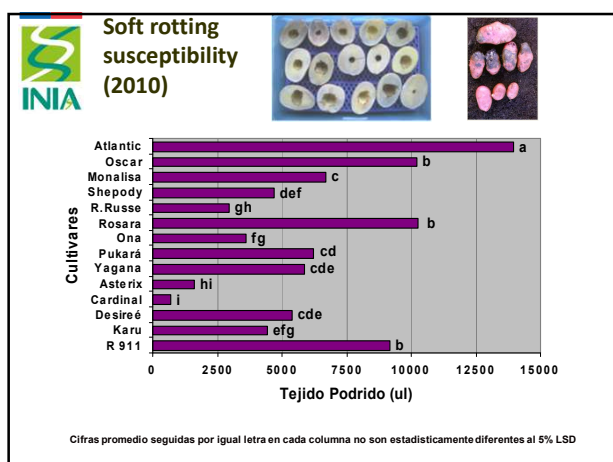
PCA in NB 27°C 24 hrs  
Centrifuge, 4000rpm  
Pellet was resuspended  
50 ul of  $10^6$  cfu/ml

## Evaluation

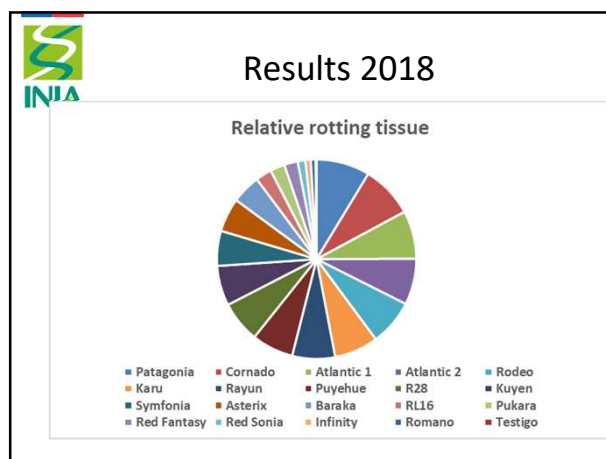
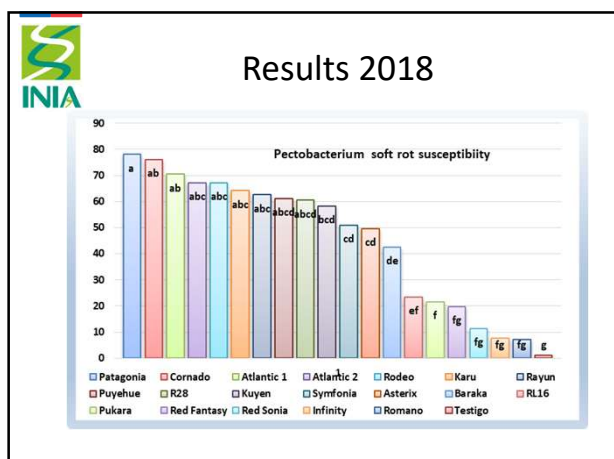


Data: ul of water per tuber.

## Results





**Comments**

- Patagonia was the most susceptible variety to soft rot, followed by Atlantic and Cornado.
- The most resistant varieties were Romano, Infinity, and Red Sonia.
- This information can be used to take decision management for soft rot disease.
- Next: Evaluation for blackleg resistance
- Next: Evaluation with other bacterium species.
- Next: Multifactor evaluation.

**Participants**

- INIA Chile
- SAG Chile
- Chilean Potato Consortium
- Potato Seed Producer
- Collaborators:
  - Chilean Potato Association
  - NDSU
  - Wageningen University
  - The James Hutton Institute
- Project Finance by Agricultural Innovation Agency of Chile FIA

