

Monitoring Silver Scurf and Black Dot in Commercial Potato Crops from Plantation to Shop Shelf

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Silver scurf

Helminthosporium solani

Symptoms only on tubers!

- ➔ (only) affects quality
- ➔ no yield reduction



Black dot

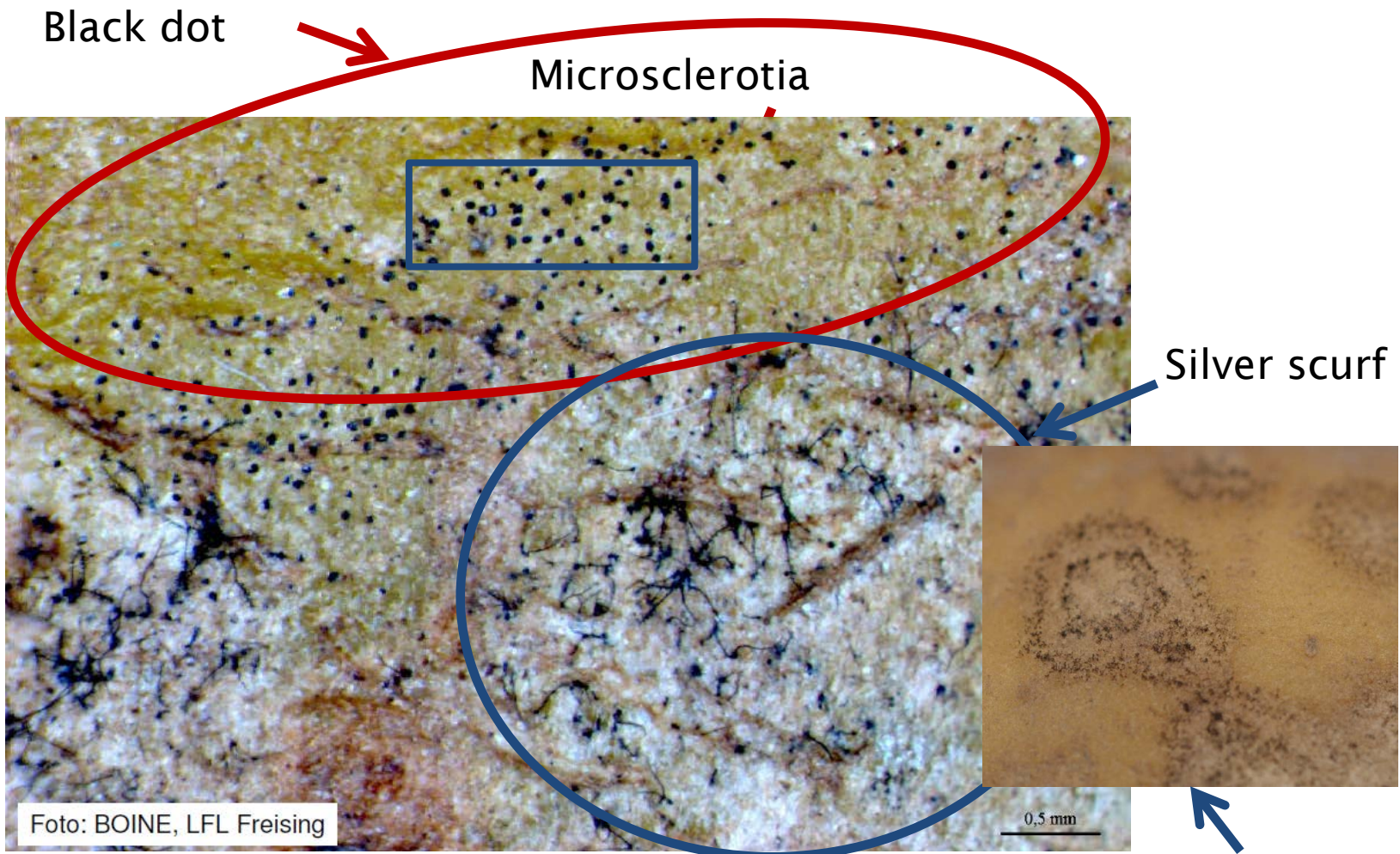
Colletotrichum coccodes

Symptoms on leaves, stems, stolons, roots and tubers!

- ➔ Influence on yield and quality!



Clear distinction only with binocular



Integrated control of silver scurf and black dot in the potato industry 2016 – 2019

WP1: Disease development from plantation through storage to packaging.

HAFL

WP2: Host plants of *Colletotrichum coccodes* (field crops and legumes)

Agroscope Wädenswil

WP3: Sensitivity of potato varieties *Agroscope Changins*

WP4: Direct control *HAFL, FiBL*

- a) Seed and soil treatments with synthetic and organic products
- b) Biofumigation with brassicaceae

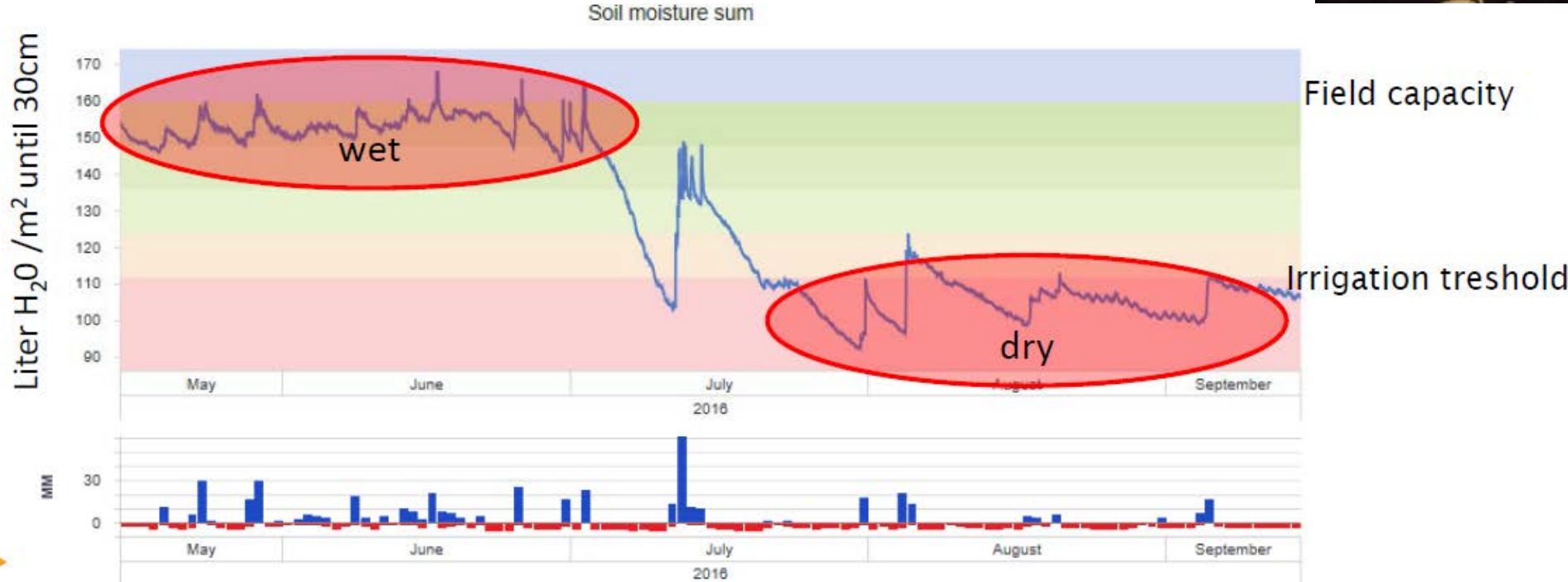
WP5: Efficiency of storage treatments (Plant extracts, antagonists, mineral products, Ozone und UV-C *Agroscope Changins*)

➔ Development of an integrated control system

WP1: Disease development from plantation through storage to packaging (2016-2018).

Objectives

- Identify critical periods and main influencing factors

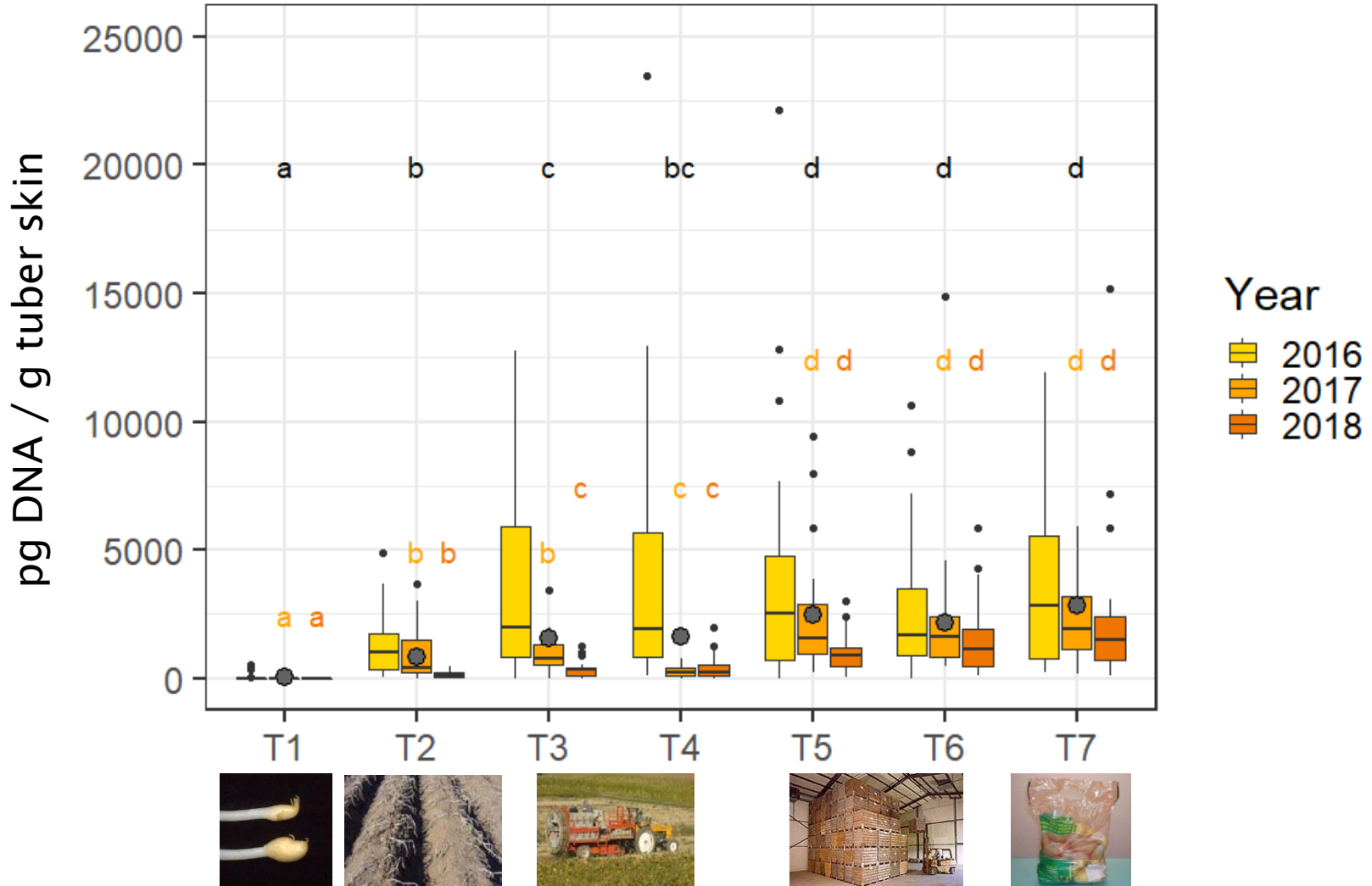


Field capacity

Irrigation treshold

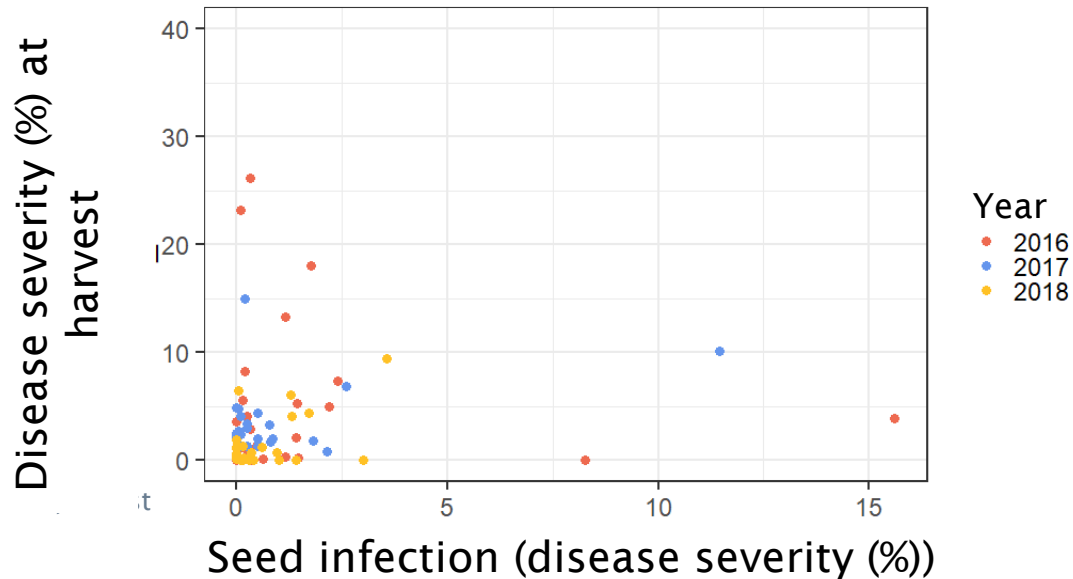
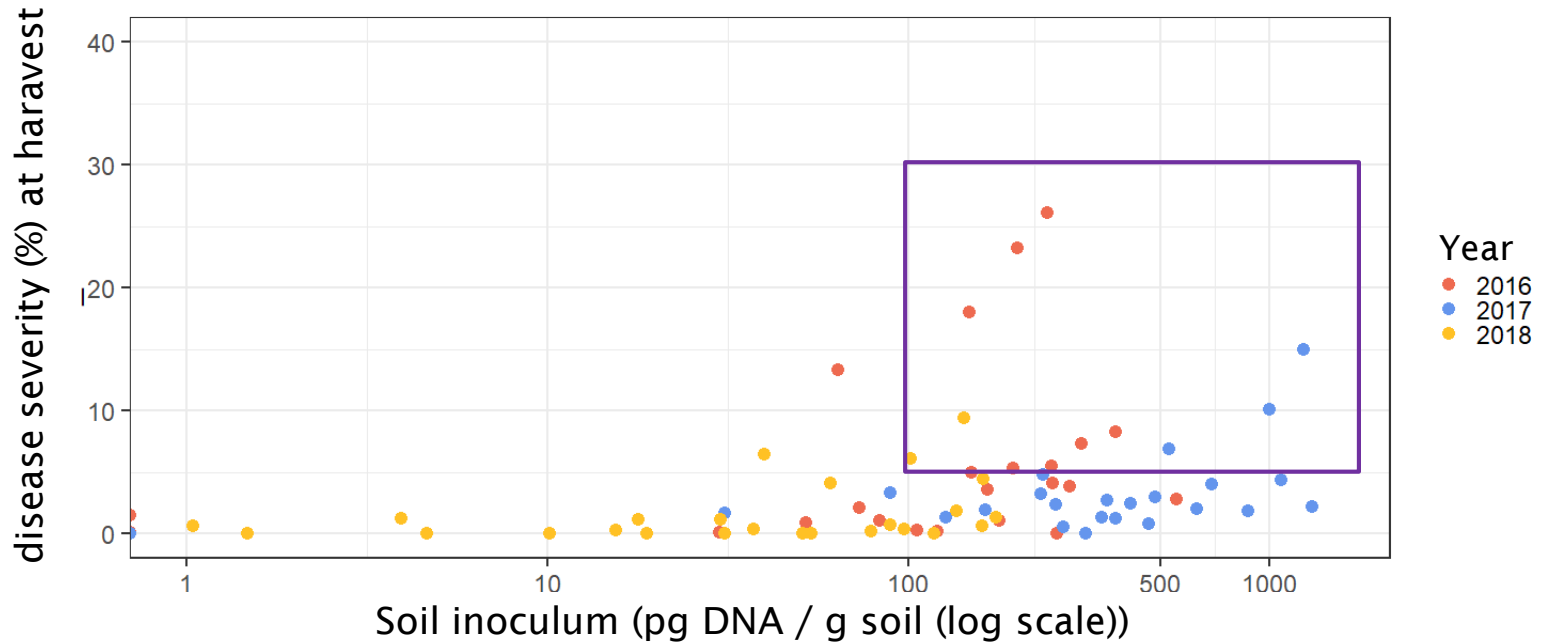


Black dot DNA Plantation to shop shelf



Black dot severity at harvest

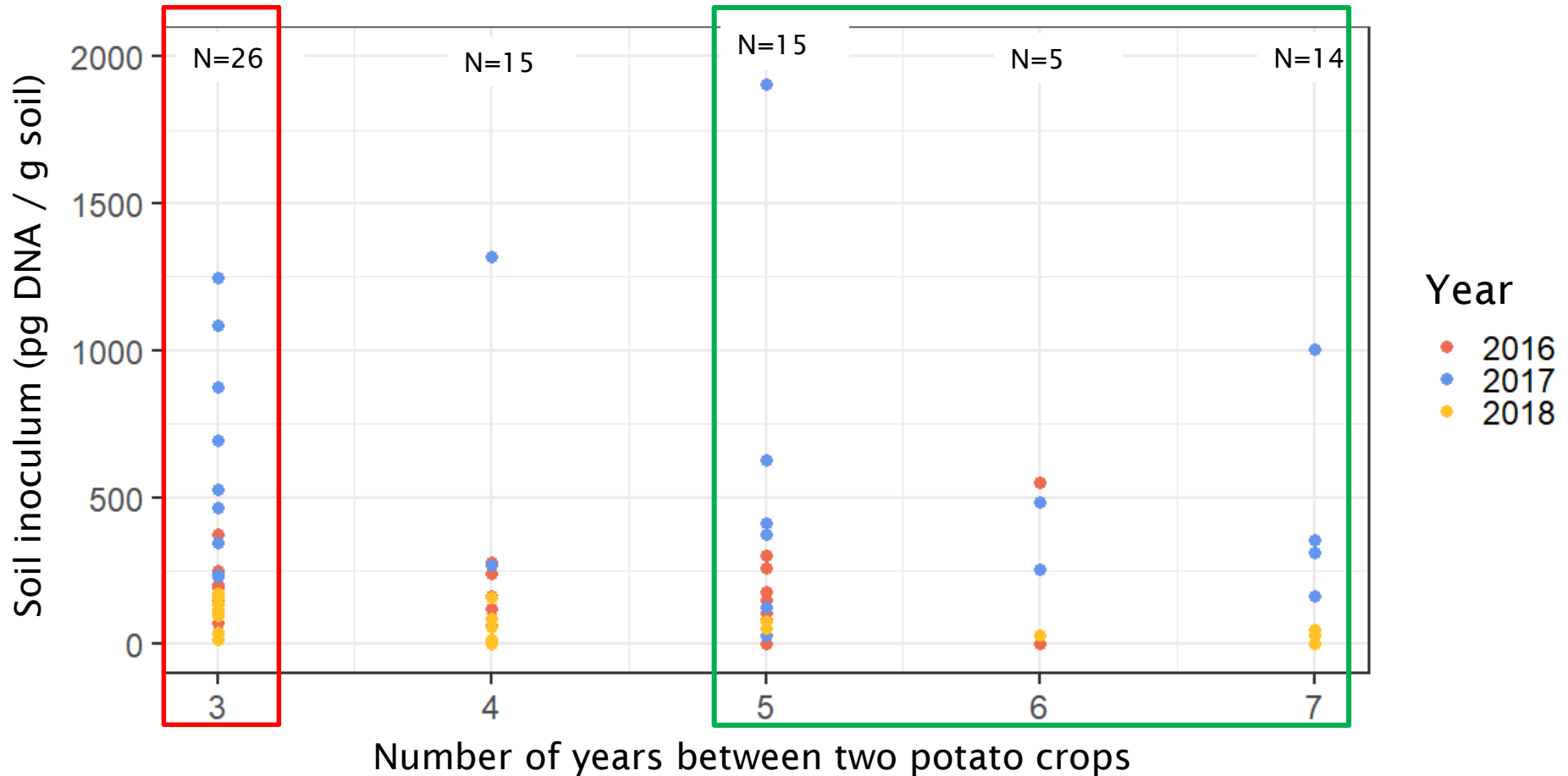
Influence of soil inoculum and seed infection



Black dot Rotation and soil inoculum

81% > 100 pg DNA/g soil

40% > 100 pg DNA/g soil



WP2: Hostplants of *Colletotrichum coccodes*

- Pot and field trials in soil with artificial inoculation with over 30 plant species
- Microscopic analysis of root infections

Main host plants

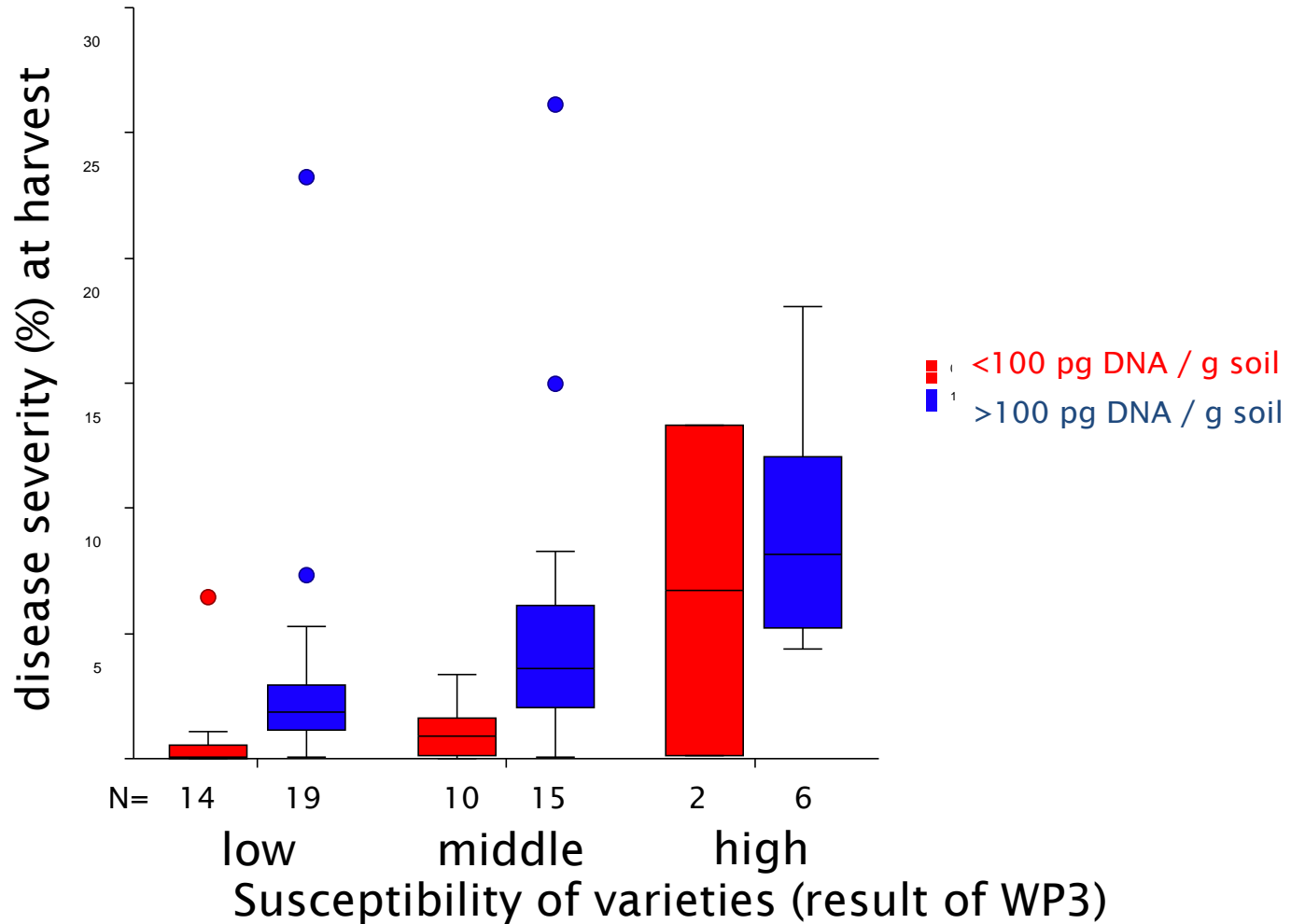
Solanaceae	Potatoes, tomatoes, red pepper,
Apiaceae	carrots
Liliaceae	onions
Chenopodiaceae	beetroot, sugar beet
Brassicaceae	broccoli
Asteraceae	lettuce
Cucurbitaceae	courgette

- No root infection: Wheat, maize, soybean, peas, beans, sunflower, grass

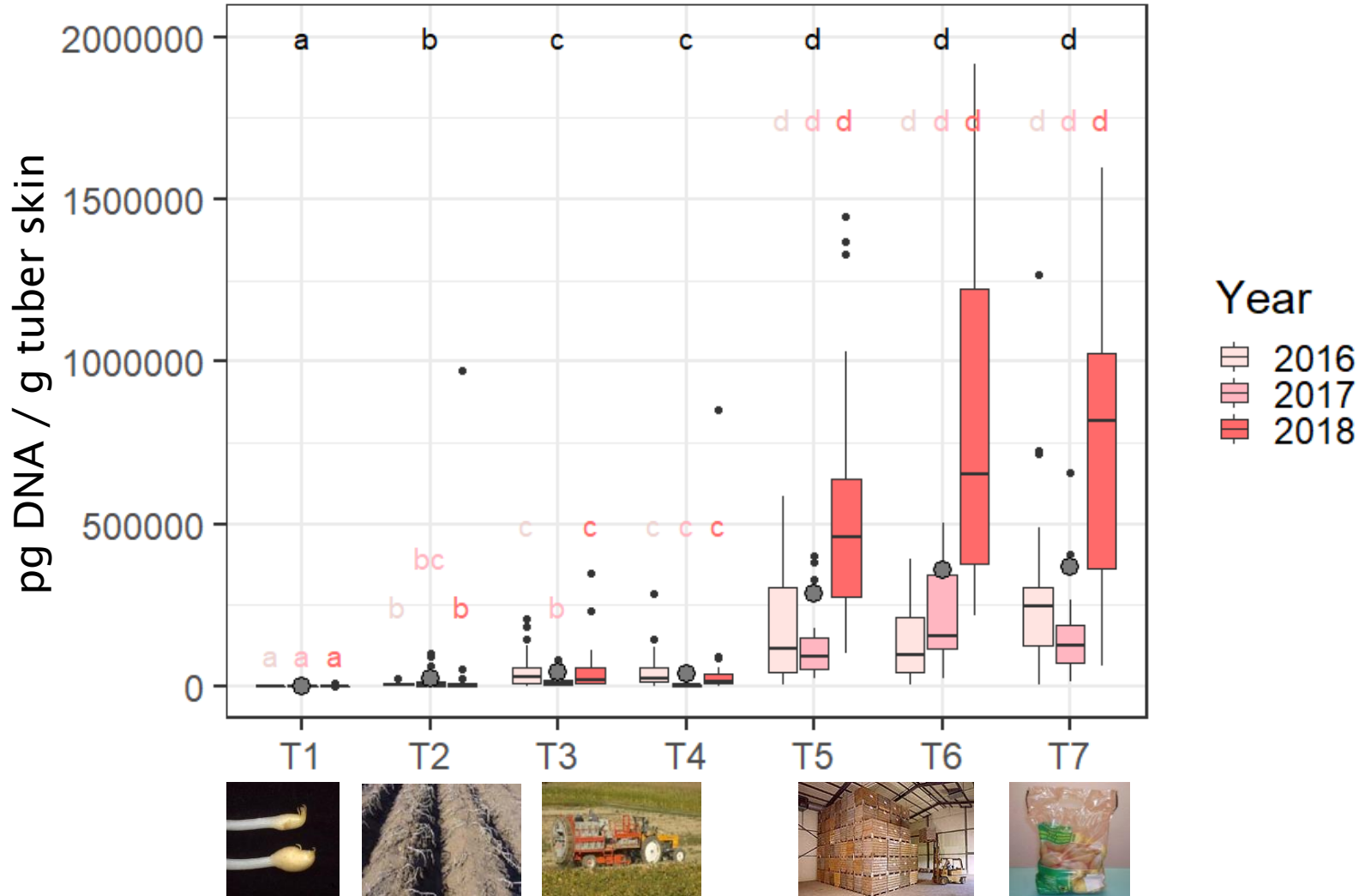


M. Lutz Agroscope

Susceptibility of varieties and soil inoculum



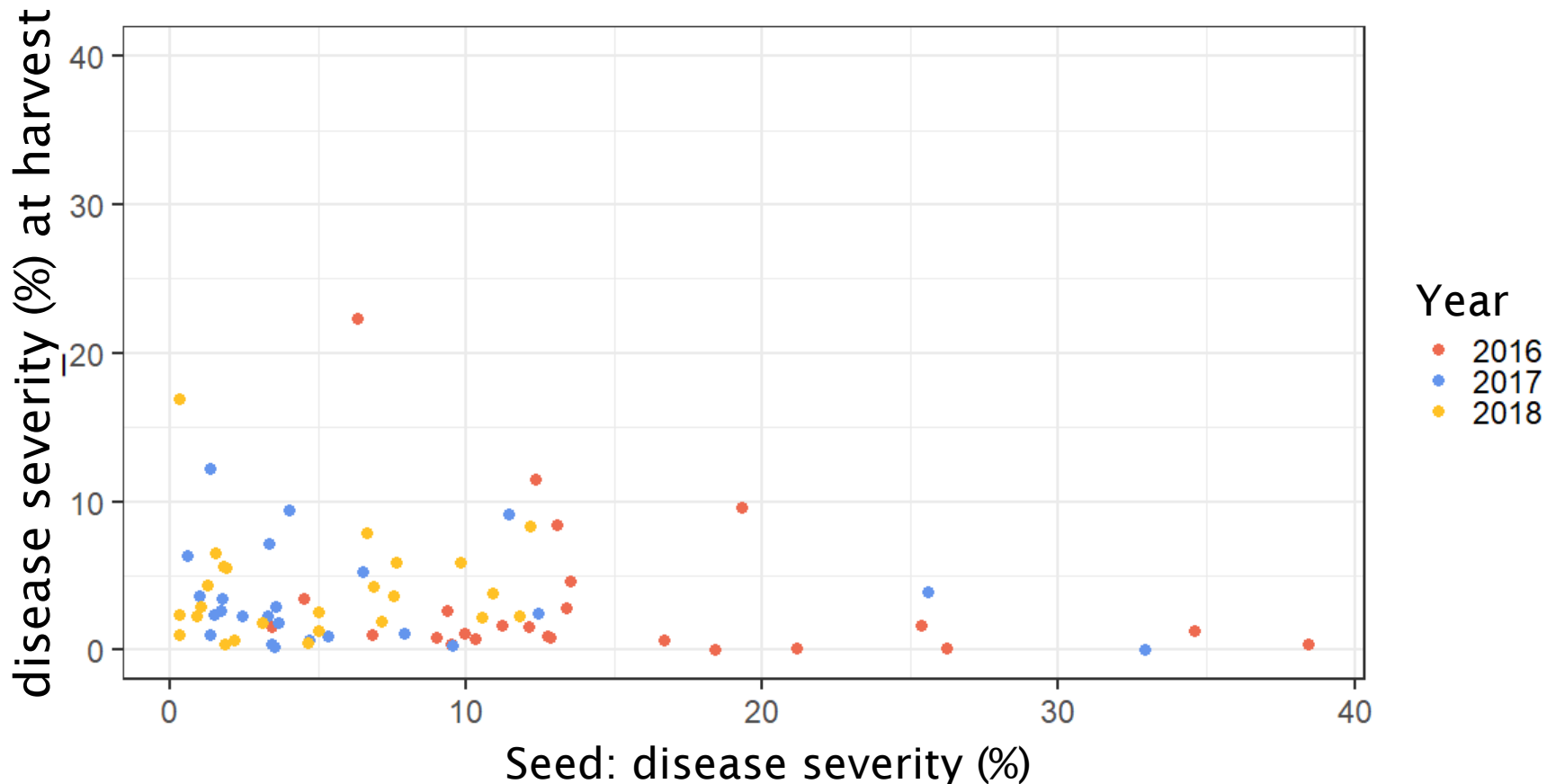
Silver scurf DNA Plantation to shop shelf



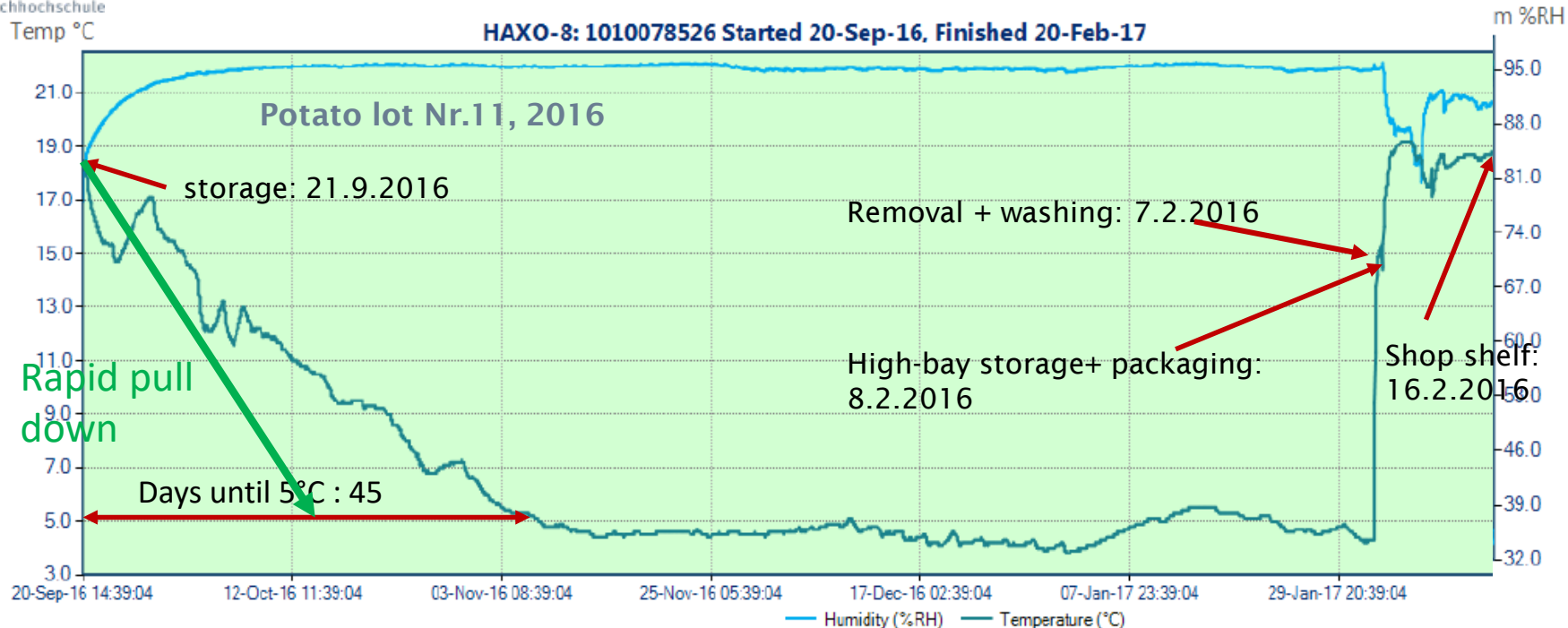
Silver scurf severity at harvest

Influence of soil inoculum and seed infection

DNA of *H. solani* was only detected in one of the 75 fields



Disease development from harvest to shop shelf



harvest: 17.9.2016

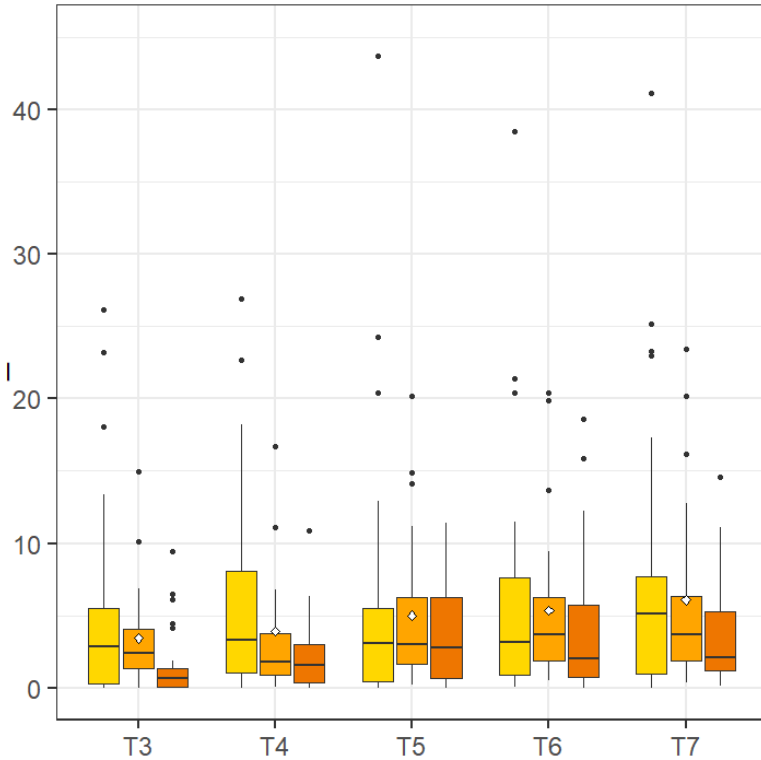
% infested tuber surface (sample size 200 tubers)

	21.9	7.2.	8.2	16.2
Black dot	2.7%	3.7%	3.9%	5.1%
Silverscurf	0.15%	10.7%	10.3%	13.6%

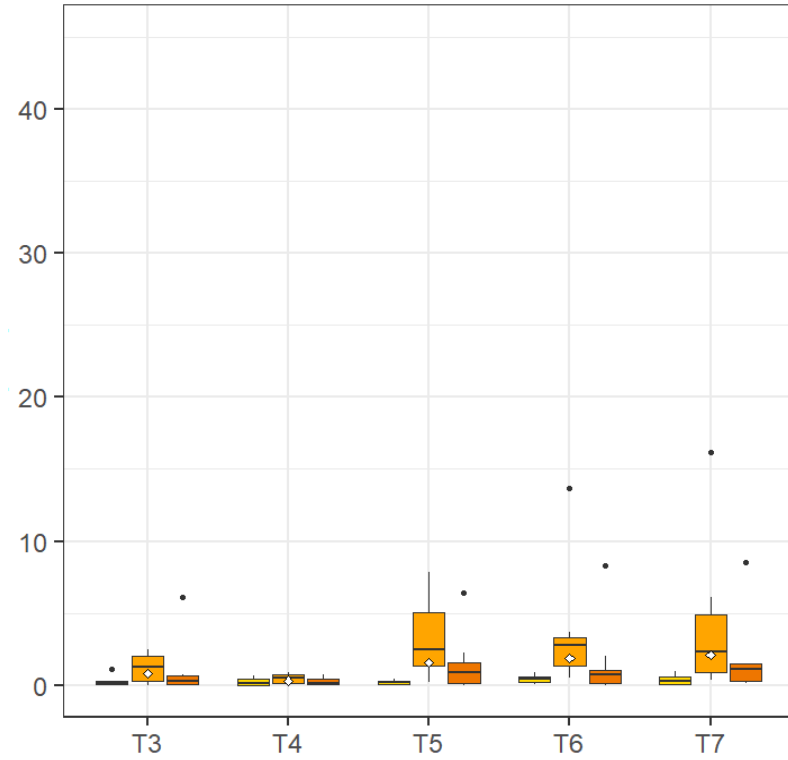
Black dot severity (%) development Harvest to shop shelf

ALL POTATO LOTS

disease severity (%) at harvest



LOTS WITH <1% AT HARVEST



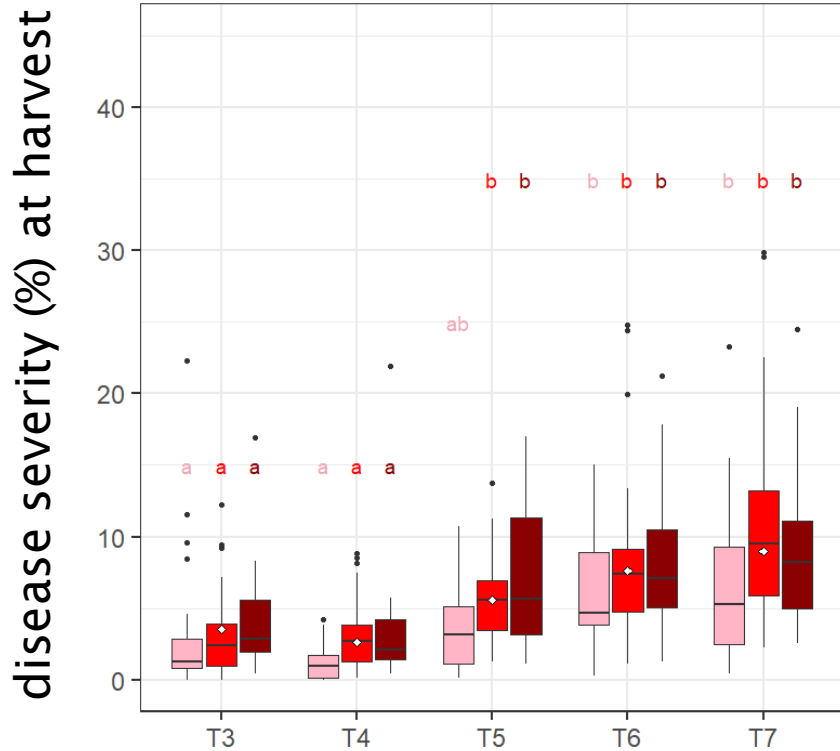
Year

- 2016
- 2017
- 2018

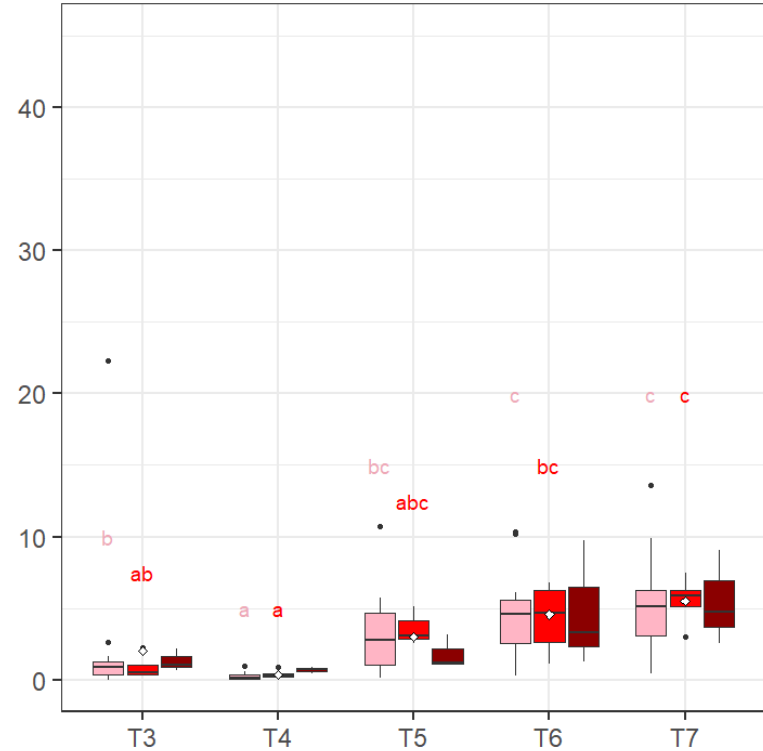


Silver scurf severity (%) development Harvest to shop shelf

ALL POTATO LOTS



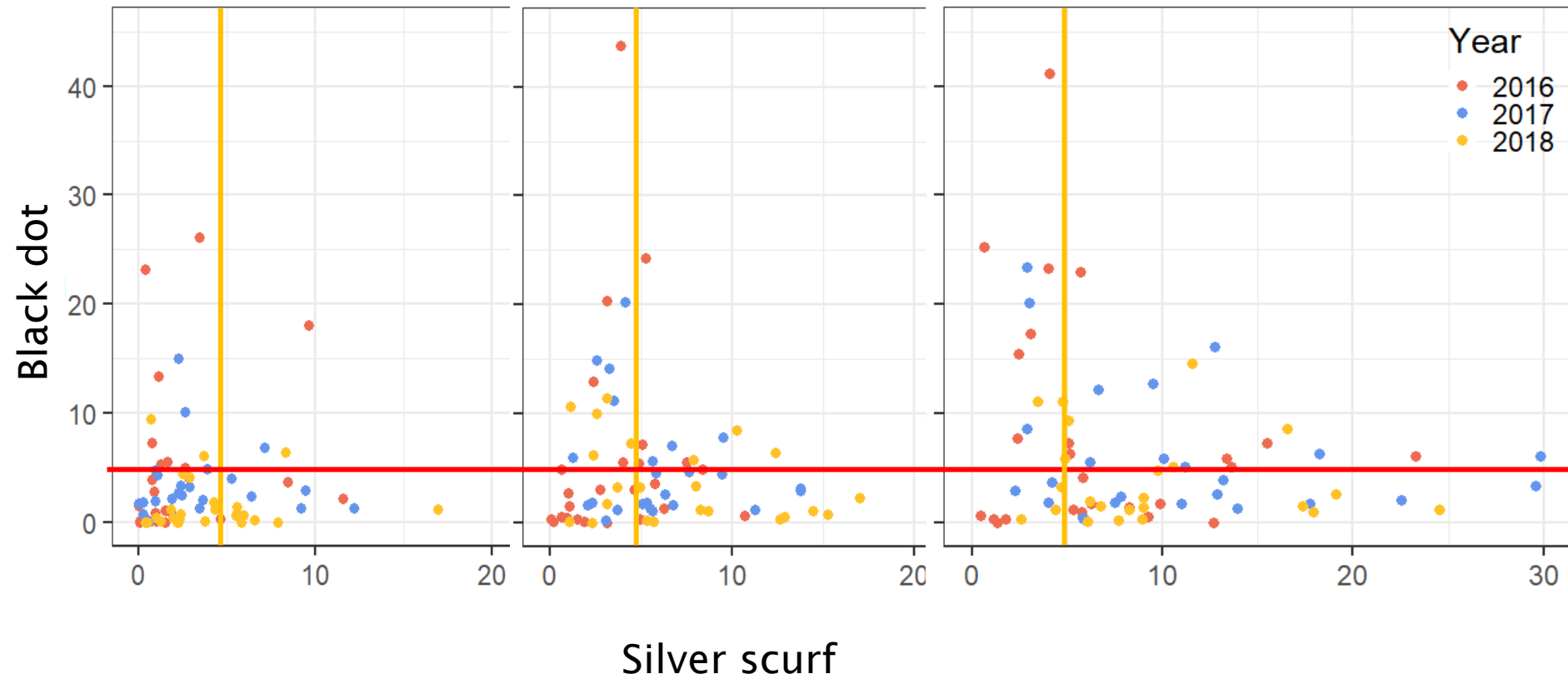
LOTS WITH <1% AT HARVEST



Year
 2016
 2017
 2018



Silver scurf and black dot disease severity (%)



Black dot:

- ▶ The effect of soil inoculum is influenced by other factors; climatic conditions, variety, ...
- ▶ Soil inoculum tends to be lower in longer crop rotations, ...
.... but higher inoculum was also found with long intervals of 5 and more years
Influence of other host plants (WP2) or volunteer potatoes?
- ▶ No correlation between seed potato infection and disease level at harvest.
- ▶ Potato lots with low disease severity (<1%) at the beginning of storage stayed clean during storage and after packaging.

Silver scurf:

- ▶ Soil inoculation detected in one of the 75 fields. Sensitivity of qPCR?
- ▶ No correlation between seed and progeny disease levels.
- ▶ Disease severity increased significantly during storage.

Conclusion and outlook

Black dot

- ▶ Disease development in the field appears to be the crucial phase
- ▶ Focus: Farming techniques and environmental factors;

Silver scurf

- ▶ The storage phase seems to be crucial for the final quality of a lot
- ▶ Focus: Storage conditions
- ▶ Development of alternative storage treatments (WP5)

Focused data analysis will help to determine influencing factors.

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Integrated control of silver scurf and black dot in the potato industry 2016 – 2019

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