ORGANIC PLUS

Do we have resistant cultivars and how to protect them against blight?

Jens G. Hansen & Isaac K. Abuley, Aarhus university

AARHUS UNIVERSITY

EuroBlight
A potato late blight network for Europe

BlightManager

IPM 3.0 to support F2F and organic potato production

Best management practice

Best Mar
Organic – p

Potatoes in every potatoes

Use certified see
Alternate host pl
infected mother

Early sowing and
steep ridges to p

Consider split ap
the early season
senescence that

Consider to use c

Use a more resis
important measu
production

Use alternatives
resistant cultivar
products

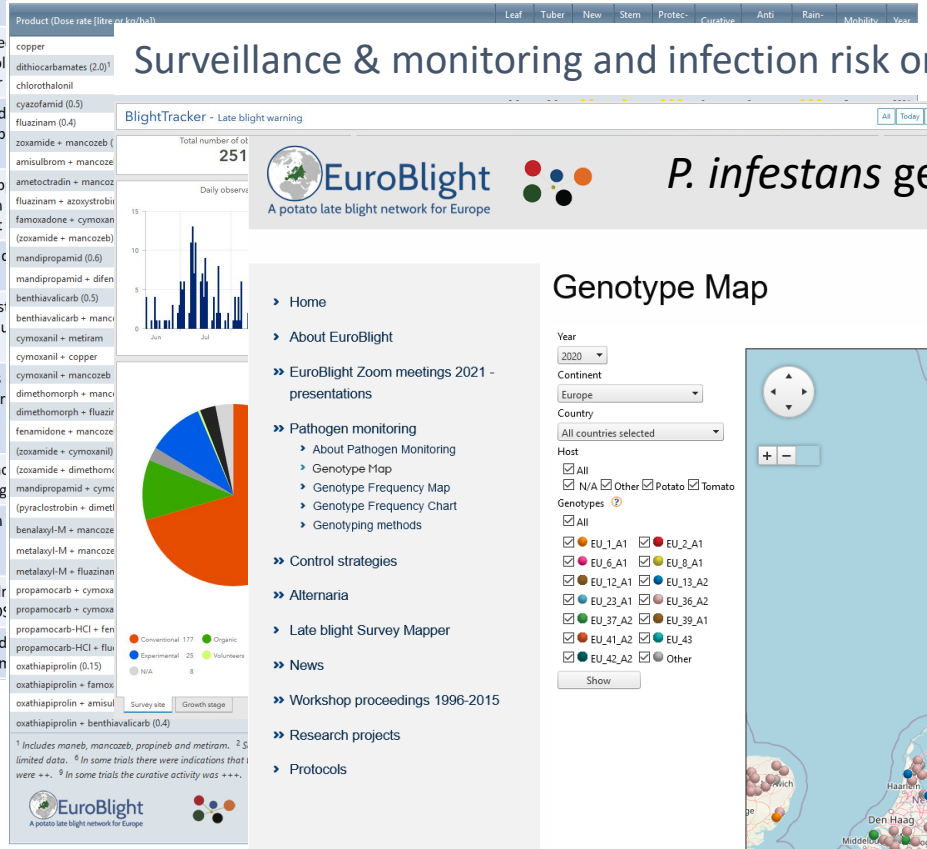
Use DSSs that inc
is adapted to org

Remove or burn

Harvest under dr
storage. Use a DS

Remove infected
conditions re ten

Biological Control Agents and PRIs - documentation of efficacy and mode of action

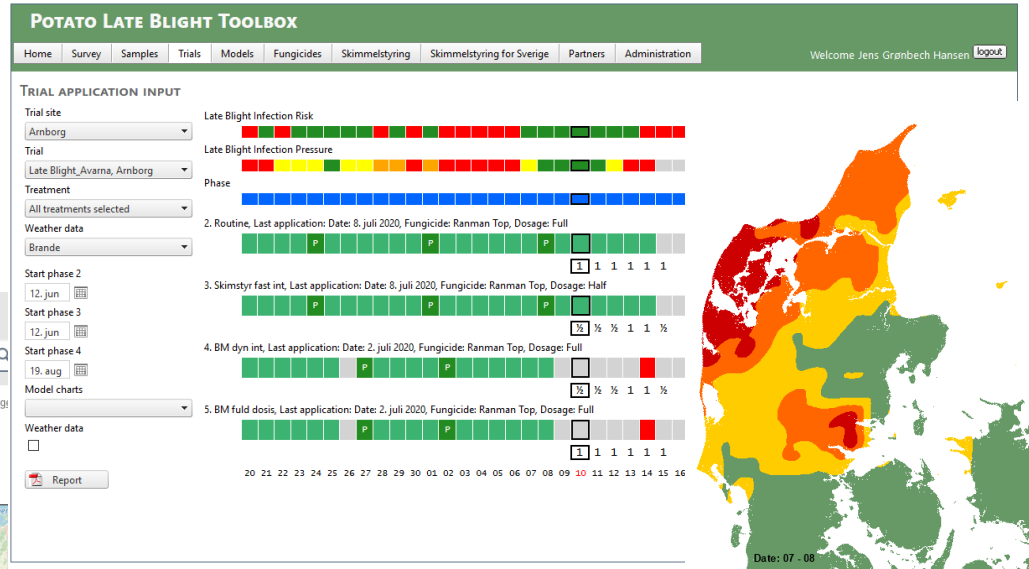


Surveillance & monitoring and infection risk on Dashboard

P. infestans genotyping

Genotype Map

Weather based DSS for timing and choice of product



Precision agriculture to optimise field operations

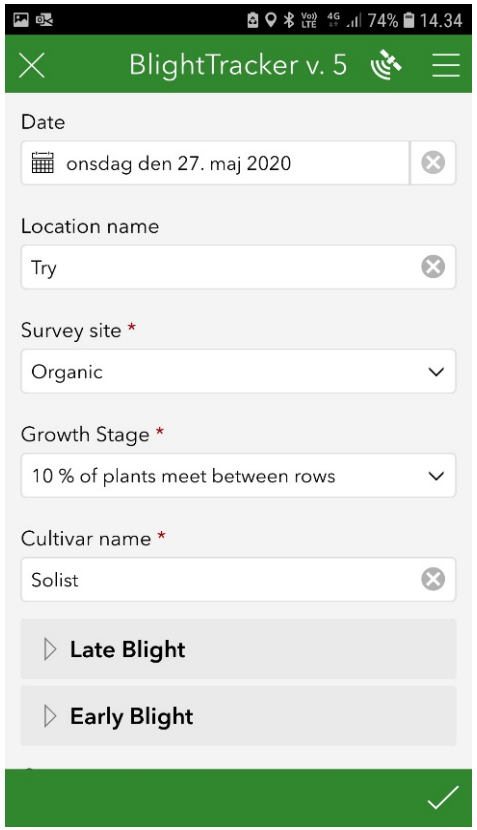
Nudging

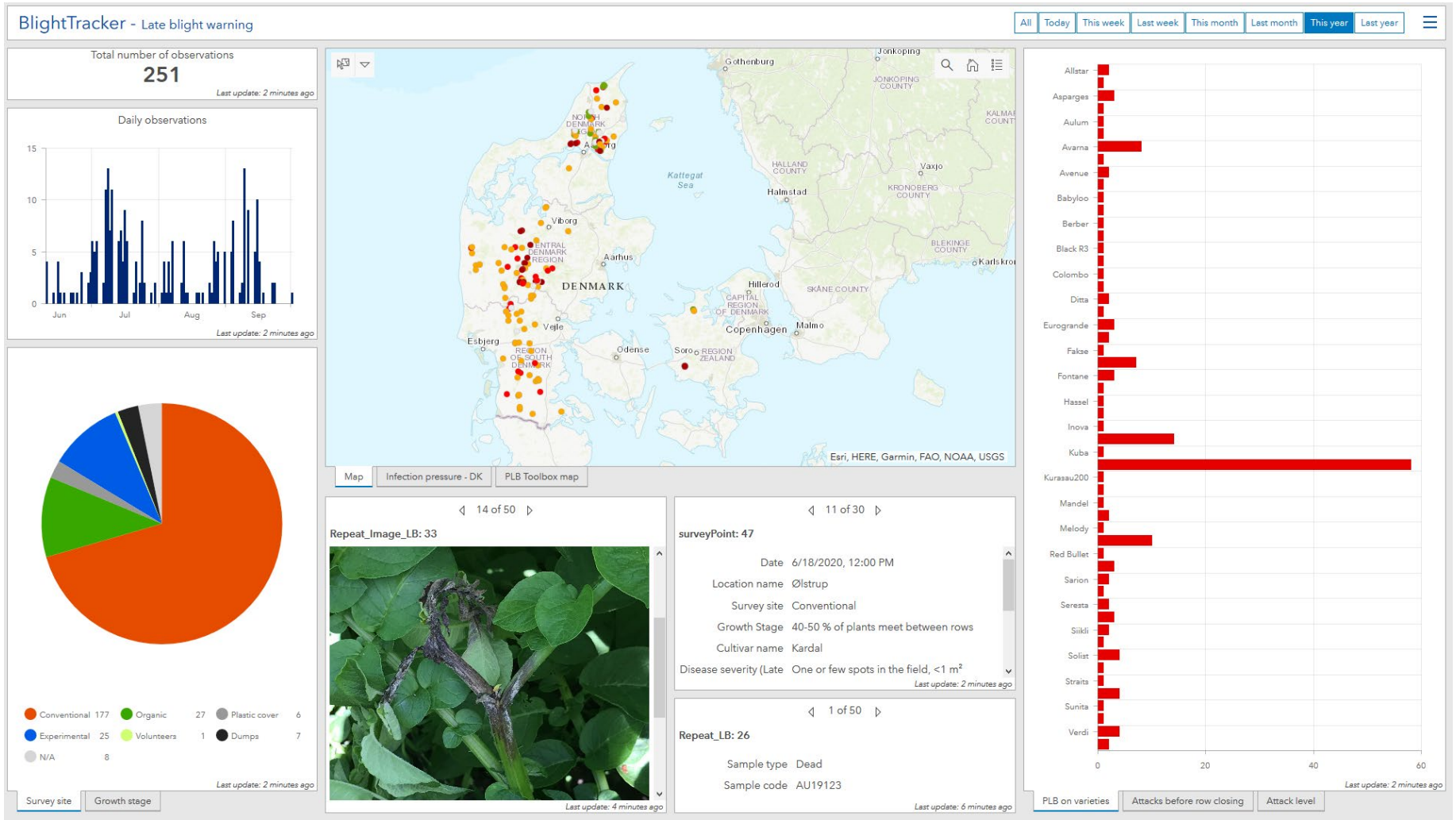
Disease surveillance and monitoring.

Denmark: From 30-50 observations 2009-2019 to 188 in 2020

BlightTracker App

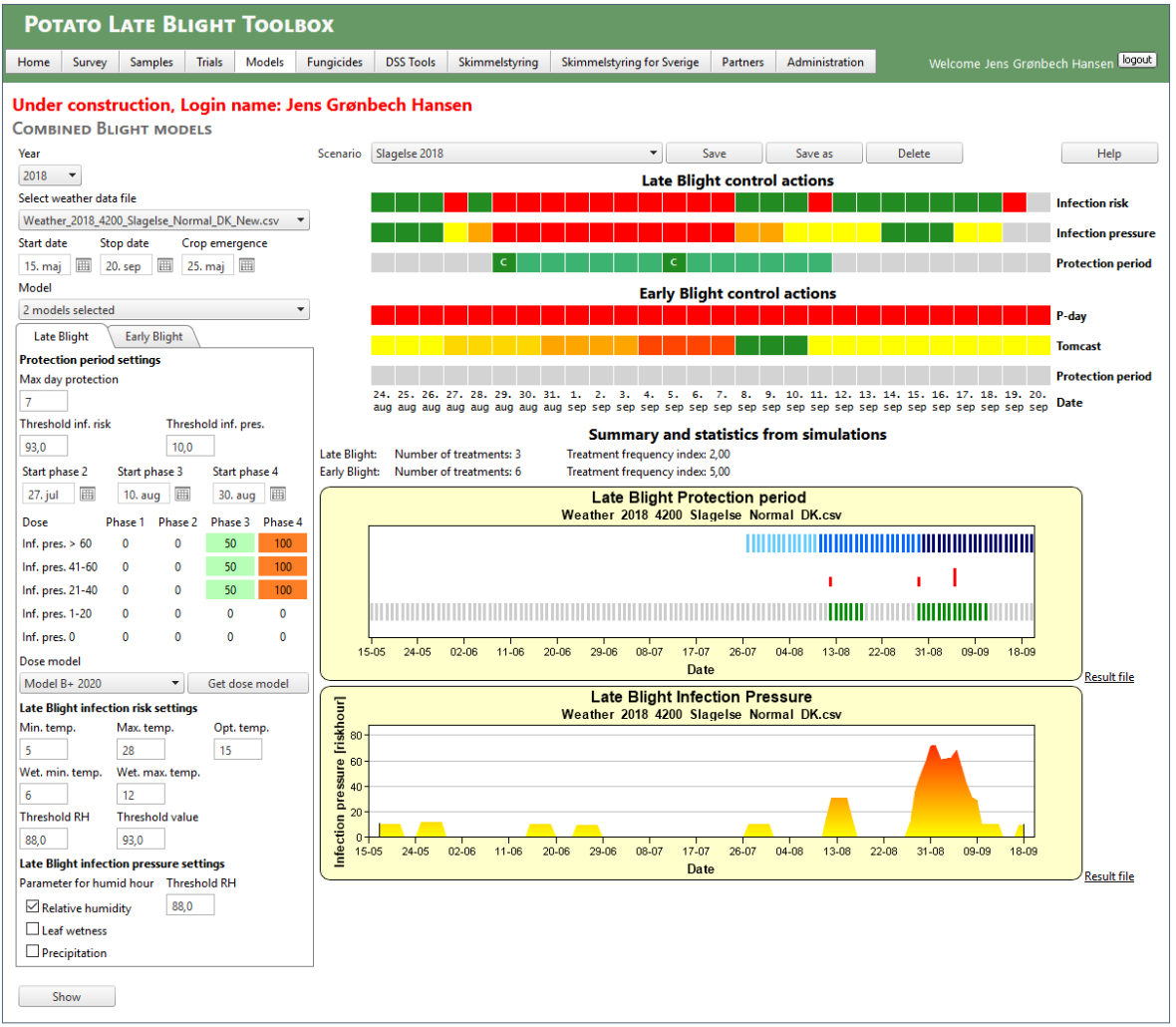
Dashboard – When, where, how much and which varieties are affected





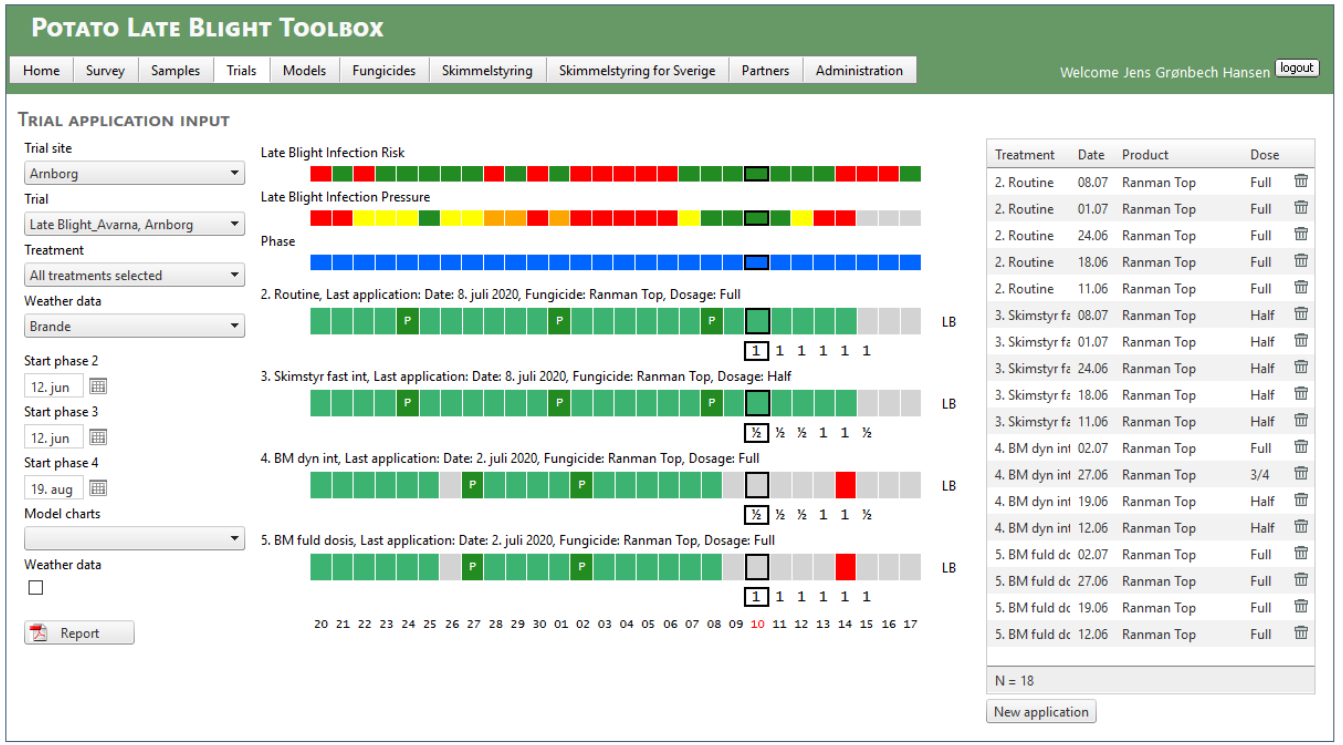
Danish BlightManager DSS

Simulation model for research



Web site provided by Aarhus University, Faculty of Technical Sciences, Department of Agroecology.
Report technical problems to webmaster: Poul Lassen. Optimized for screen size 1280x800.
Version 2.1. Build: 7577. Release date: 29. september 2020.

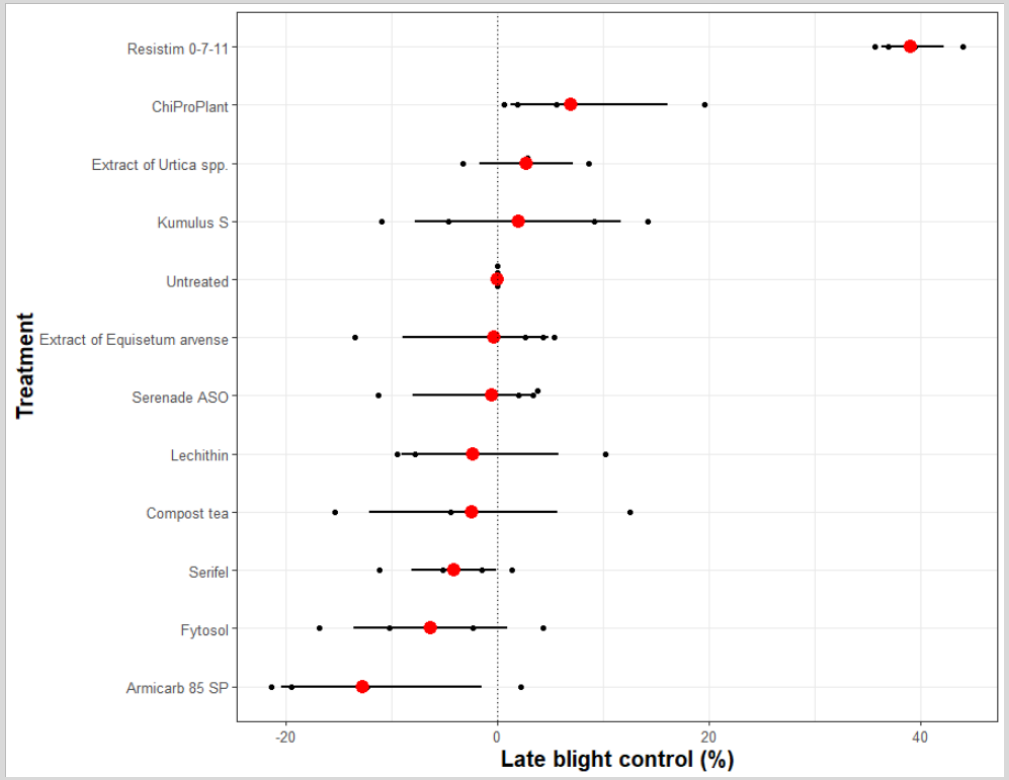
Operational version for field test



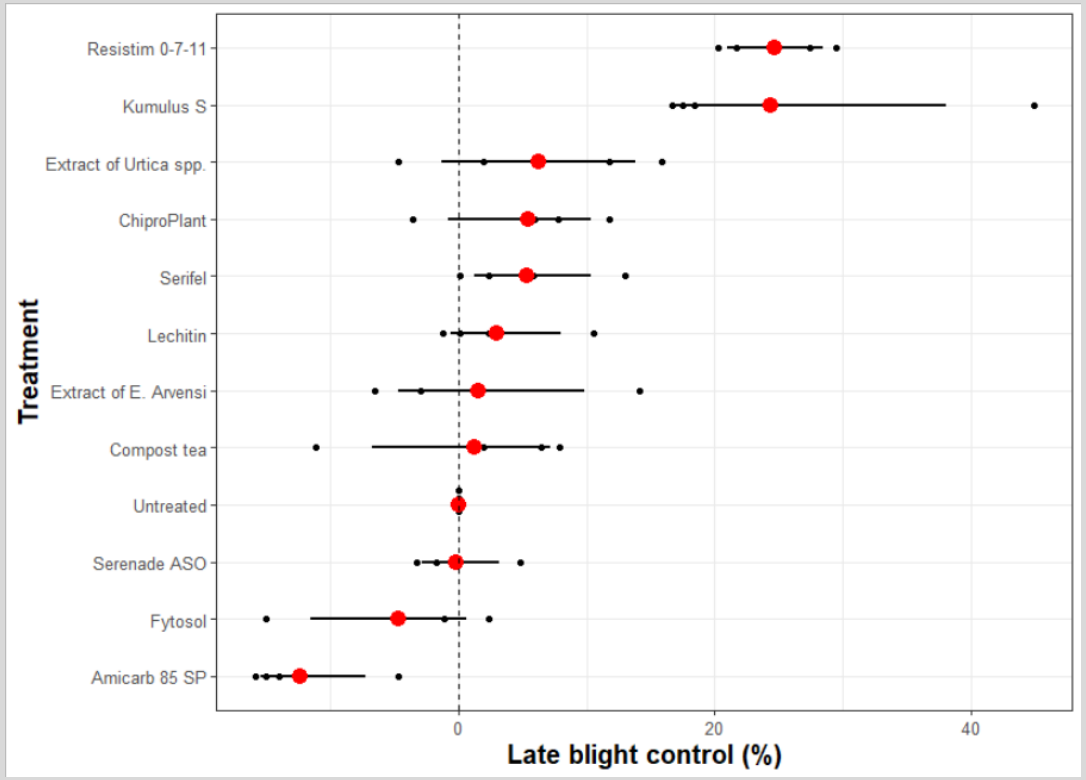
New field specific versions for farmers under construction

Efficacy of Alternative Products under different Infection Pressure

2019 (High infection pressure)



2020 (low infection pressure)



Primary attack at Foulum, 1988

Oospores 2014
Foulum

1997

Volunteer plant with blight
2015, Foulum

Sexual recombination:

- Oospore driven early attacks
- Generates genetic variation in *P. infestans* population

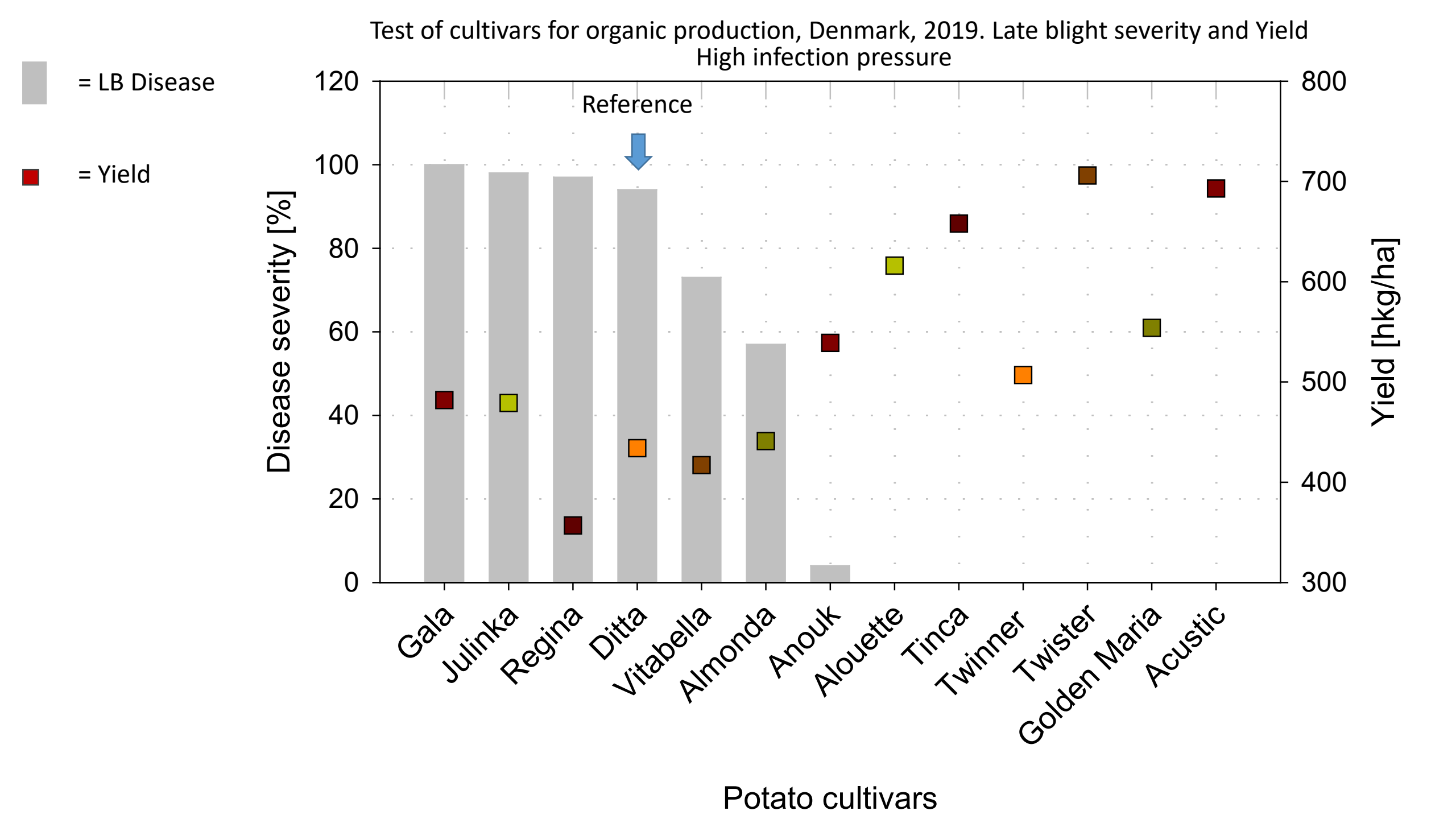
→ Risk of fungicide resistance and host specificity

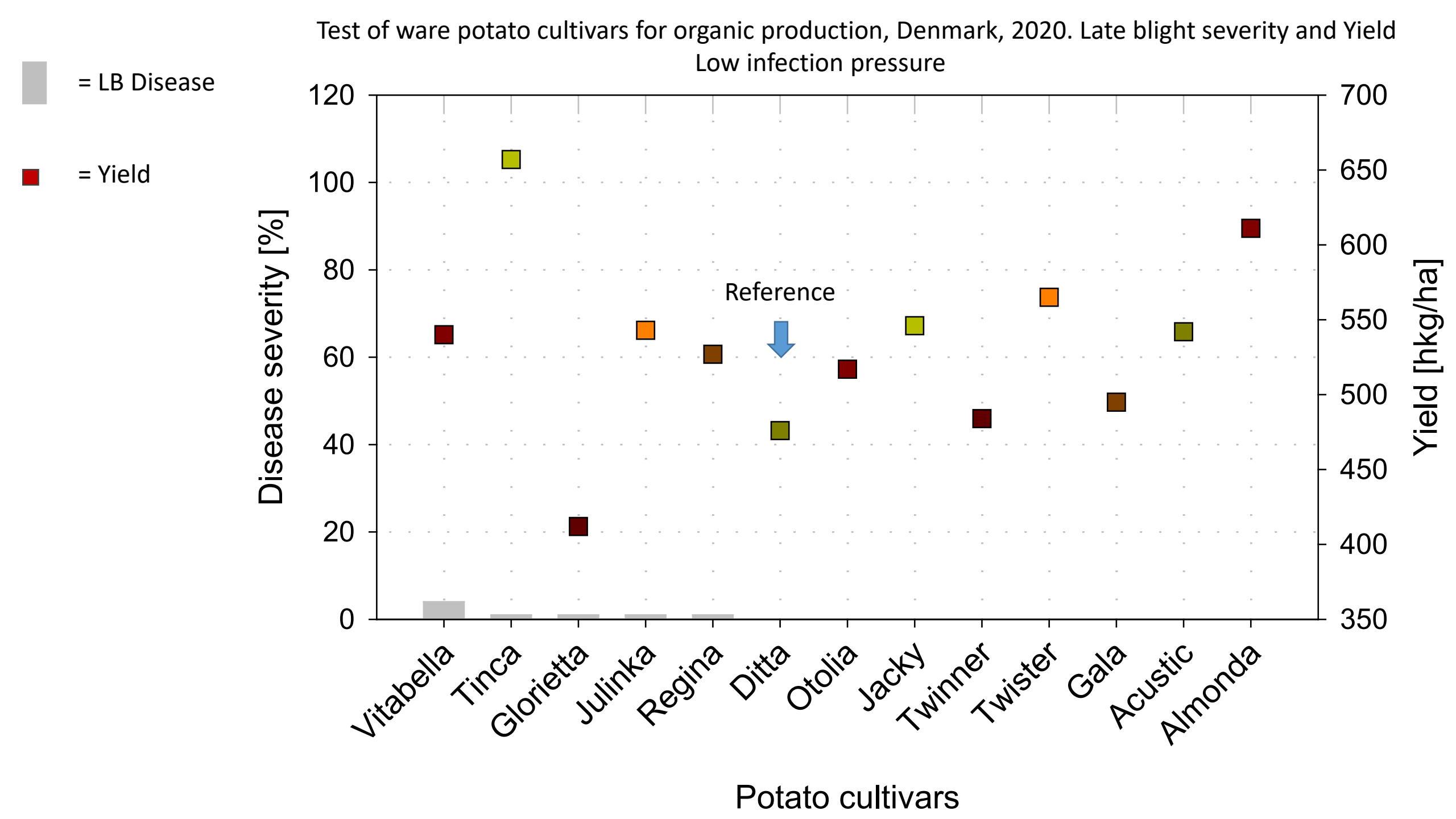
→ More aggressive and/or virulent phenotypes

Climate change, milder winters

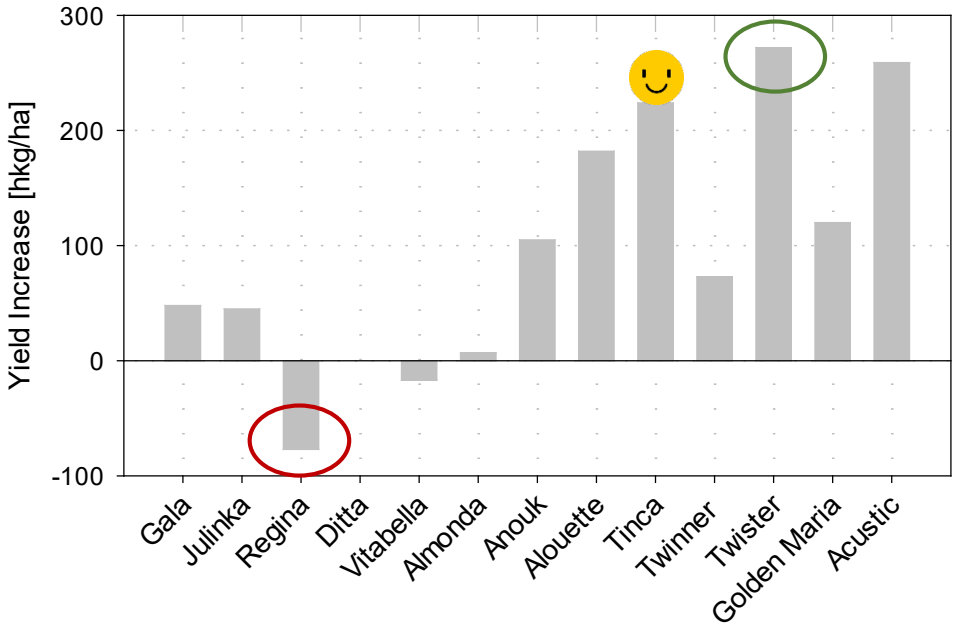
- Dump potatoes with blight
- Volunteer plants with blight

→ Succesfull clones
(EU41 & EU43)


Test of cultivars for organic production, Denmark, 2019. Late blight severity and Yield
High infection pressure
= LB Disease
= Yield
Reference
Disease severity [%]
Yield [hkg/ha]
120
100
80
60
40
20
0
800
700
600
500
400
300
Gala
Julinka
Regina
Ditta
Vitabella
Almonda
Anouk
Alouette
Tinca
Twinner
Twister
Golden Maria
Acustic
Potato cultivars


Test of ware potato cultivars for organic production, Denmark, 2020. Late blight severity and Yield
Low infection pressure
= LB Disease
= Yield
Disease severity [%]
Yield [hkg/ha]
120
100
80
60
40
20
0
700
650
600
550
500
450
400
350
Reference
Vitabella
Tinca
Glorietta
Julinka
Regina
Ditta
Otolia
Jacky
Twinner
Twister
Gala
Acustic
Almonda
Potato cultivars

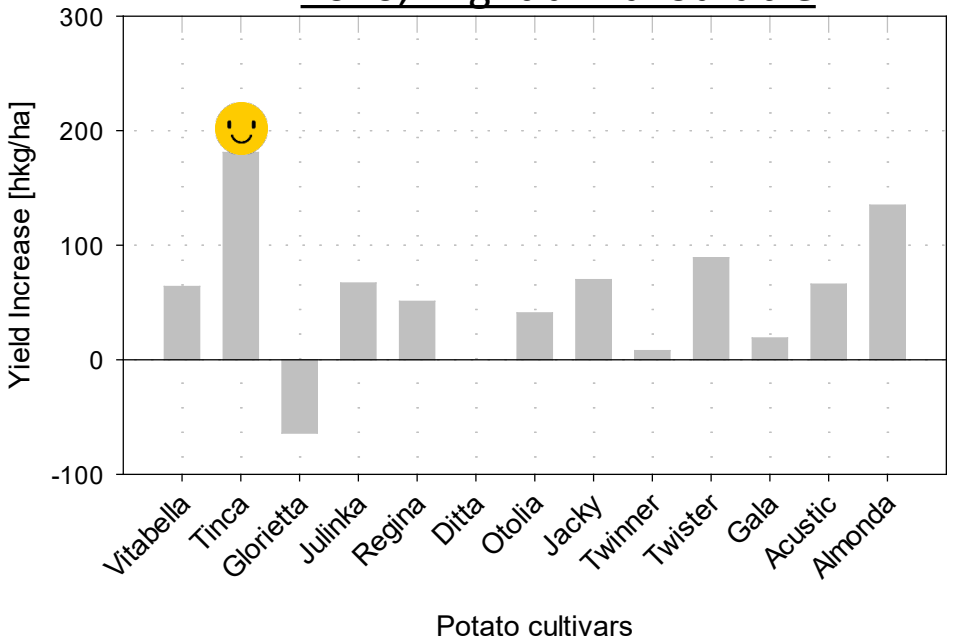
2019, Blight favourable



	Late Blight [%]	Yield (Hkg / ha]	Yield increase*
Mean	40	529	95
Minimum	0	360	-77
Maximum	100	710	270

*Reference Yield, Ditta =434 hkg/ha

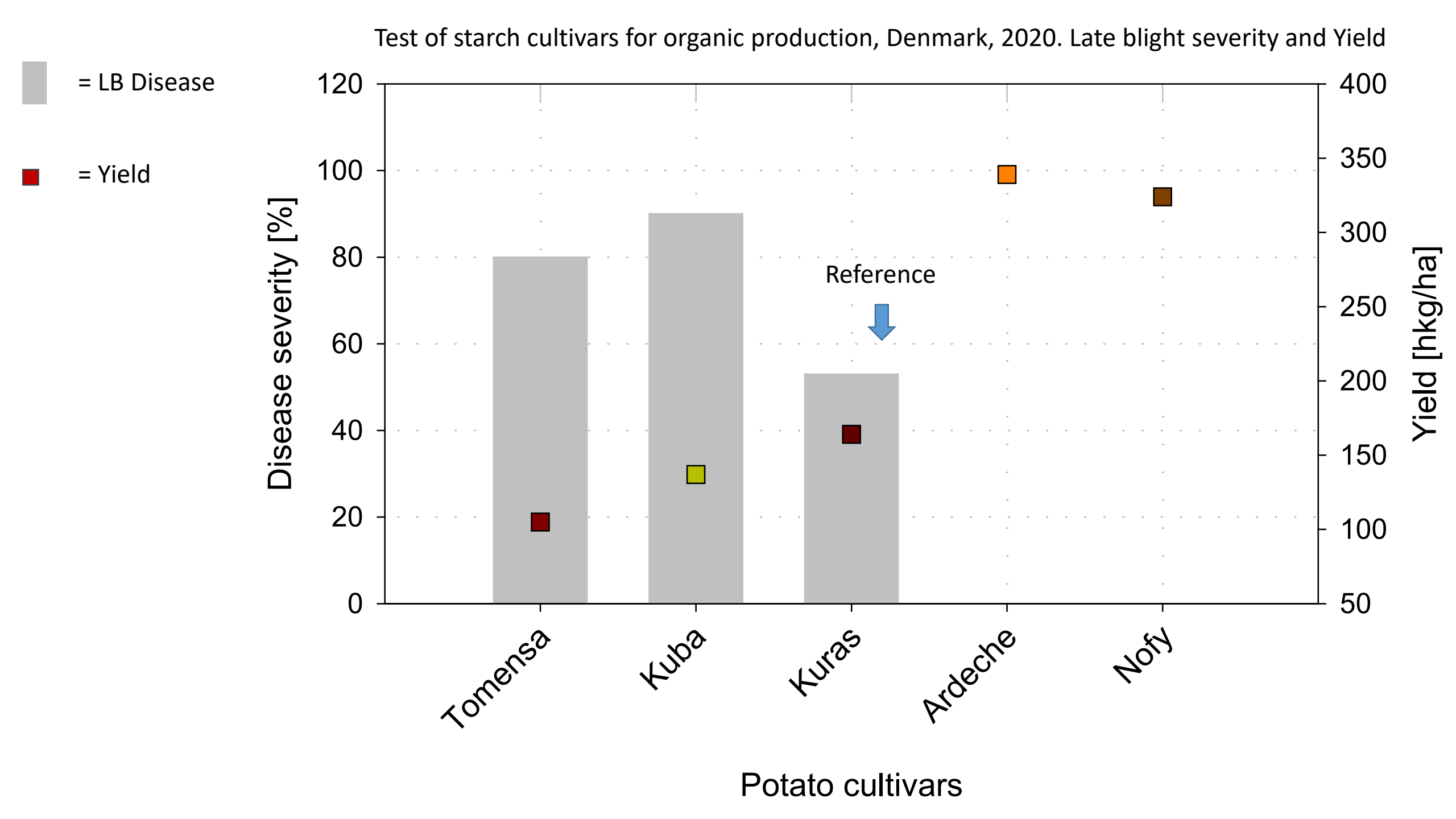
2020, Blight un-favourable



2020, Blight un-favourable

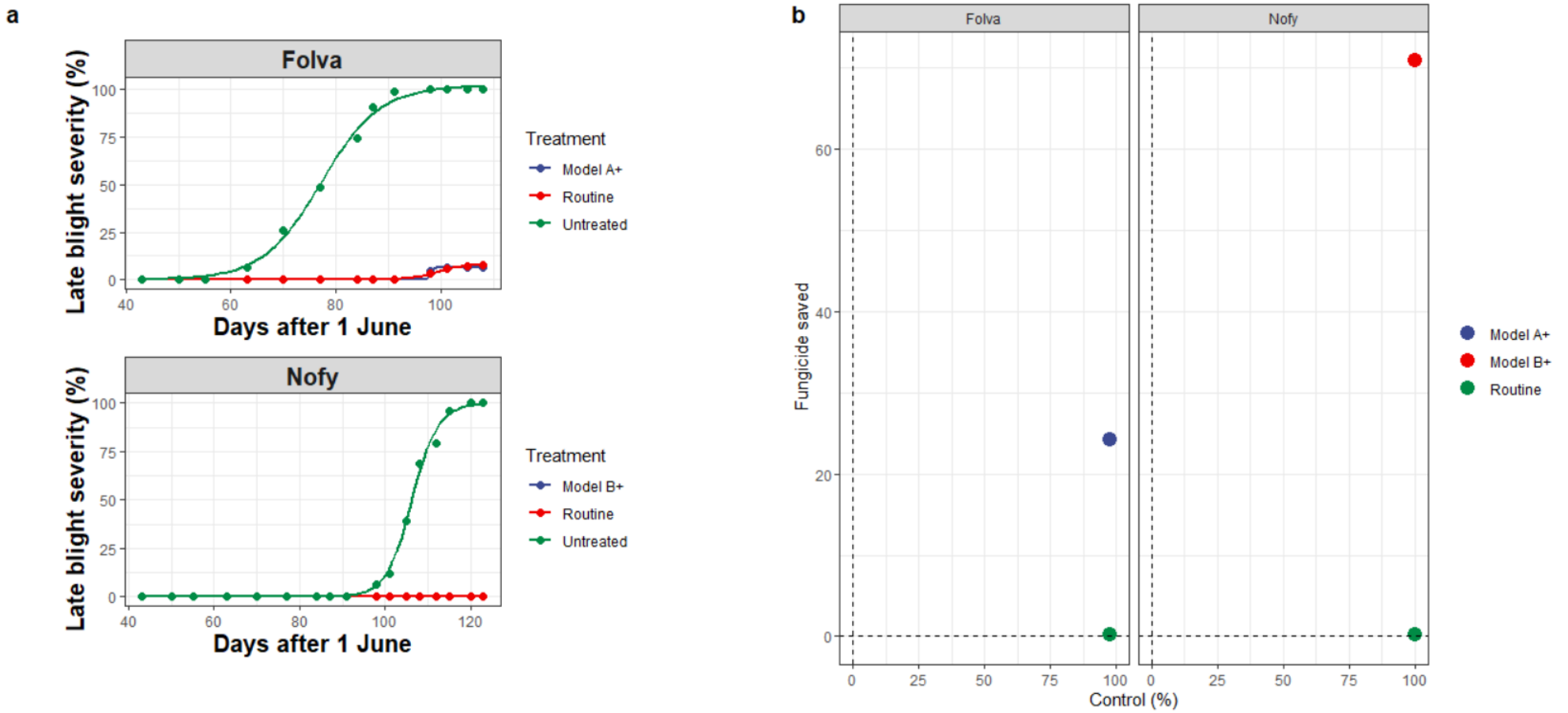
	Late Blight [%]	Yield (Hkg / ha]	Yield increase*
Mean	0,6	532	56
Minimum	0	410	-64
Maximum	4	660	180

*Reference Yield, Ditta =476 hkg/ha

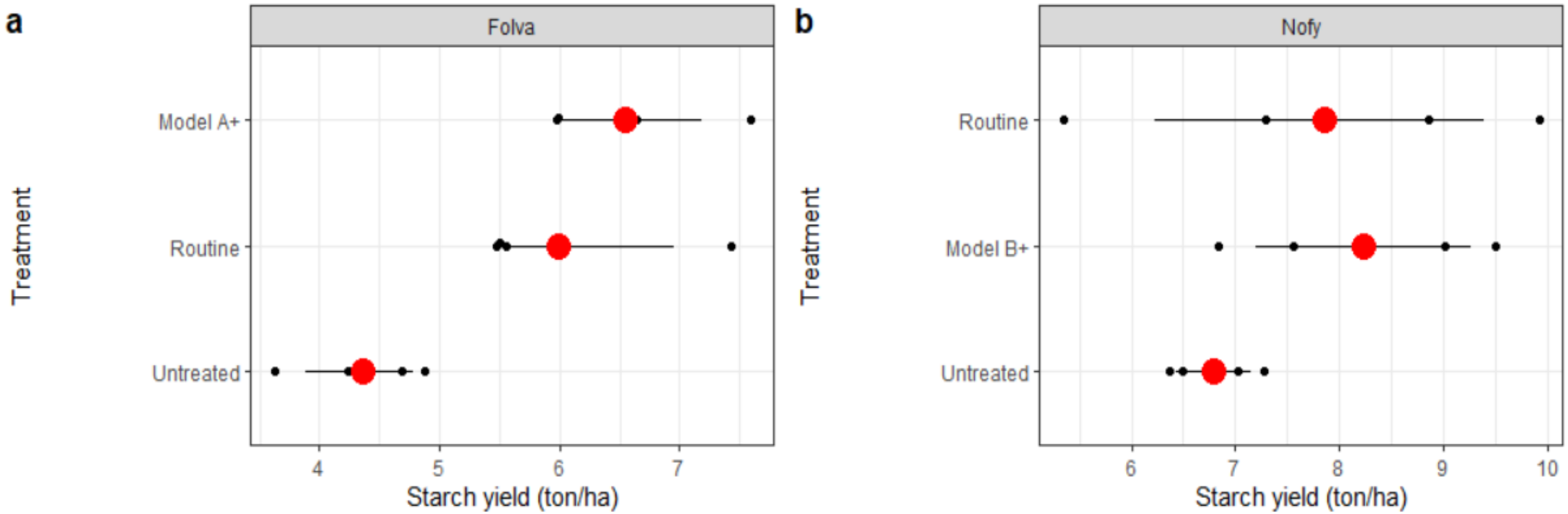

Test of starch cultivars for organic production, Denmark, 2020. Late blight severity and Yield
= LB Disease
= Yield
Disease severity [%]
Yield [hkg/ha]
120
100
80
60
40
20
0
400
350
300
250
200
150
100
50
Reference
Tomensa
Kuba
Kuras
Ardeche
Nofy
Potato cultivars

Model A+					Model B+			
Infection pressure	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	**Phase 4**
>60	50	50	75	100	0	0	50	**100**
41-60	0	50	75	100	0	0	50	**100**
21-40	0	50	50	100	0	0	50	**100**
10-20	0	0	50	75	0	0	0	**75**
<10	0	0	0	0	0	0	0	**0**

Disease development and fungicide saved



Starch yield



Conclusion IPM trials

- There is a huge potential to reduce fungicide (~60%) use in resistant cultivars
- There was a moderate, but significant fungicide reduction (~25%) in the susceptible cultivar (Folva).

Potato Late Blight Toolbox

Home | Survey | Samples | Trials | Models | Fungicides | DSS Tools | DSS Tools for Sverige | Skimmelstyring | Skimmelstyring for Sverige | Partners | Administration

Welcome Jens Grønbech Hansen logout

Under construction

Trial application status

Trial site: Henry Nielsen

Trial year: 2021

Start: 1. jun Stop: 10. aug

Trial: Late Blight_Marabel, Henry Niels

Treatment: All treatments selected

Weather data: Bording [DMI]

Weather forecast: DMI

Model charts: Late Blight Infection Pressure

Weather data

First weather parameter: Temperature

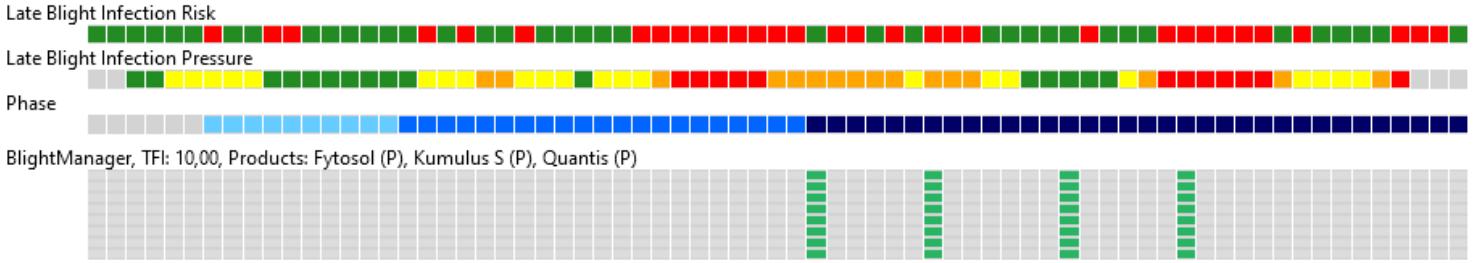
Second weather parameter: Precipitation

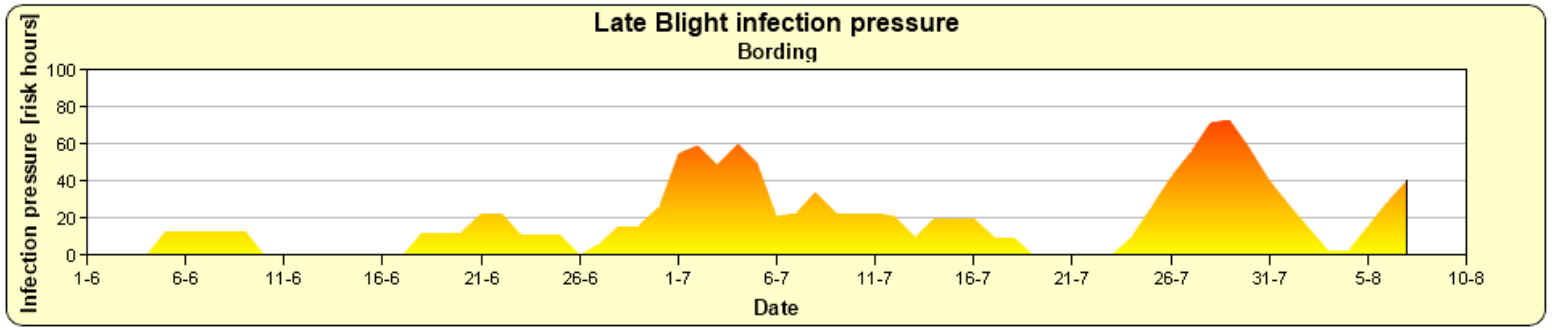
Phase legend

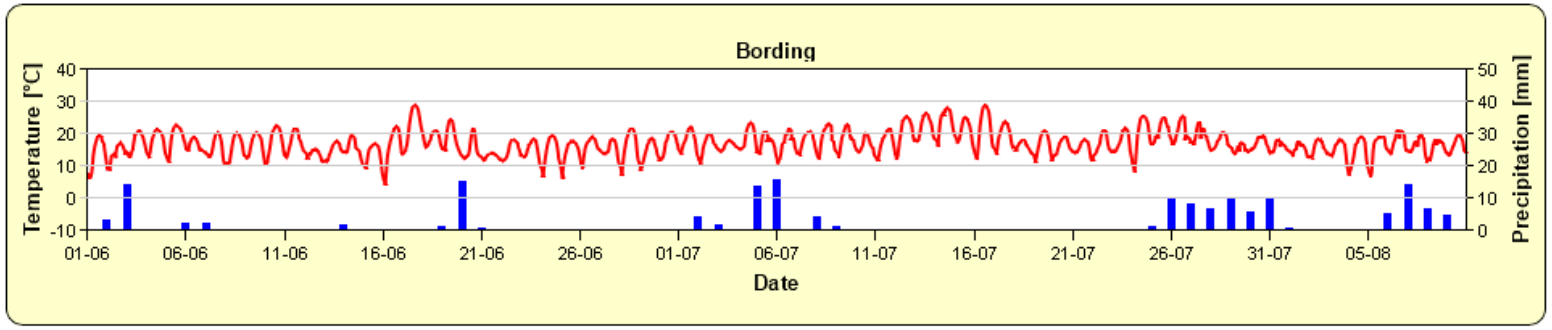
- Phase 1
- Phase 2
- Phase 3
- Phase 4

Product type legend

- Preventive (P)
- Curative (C)
- Eradicative (E)







Treatment	Date	Product	Dose	
BlightManag	27.07	Fytosol	Full	
BlightManag	27.07	Kumulus S	Full	
BlightManag	21.07	Kumulus S	Full	
BlightManag	21.07	Fytosol	Full	
BlightManag	14.07	Kumulus S	Full	
BlightManag	14.07	Quantis	Full	
BlightManag	14.07	Fytosol	Full	
BlightManag	08.07	Fytosol	Full	
BlightManag	08.07	Quantis	Full	
BlightManag	08.07	Kumulus S	Full	

Quantis: Biostimulant Reduce abiotic stress like heat and drought

Fytosol: resistance inducer

Kumulus S: Sulpher, antifungal

Unfortunately we underestimated the amount of product needed, and we started too late.

Practical problems Using Kumulus S during applications The agent clogged the nozzles.

We need to learn!

AU = BlightManager using Quantis, Fytosol and Kumulus S

Kontrol = Control, untreated

Photo from 4 August at Hedely, Bording


Kontrol
Alltech

Conclusions:

- There is a huge potential to reduce fungicide (~60%) use in resistant cultivars
- We can adapt our DSS to include host resistance, pathogen information and use of alternatives, but we need stronger compounds!
- We need to test new compounds in the lab and under field conditions (by cultivar)
- All IPM measures in action – not only cultivar resistance
- Education and training (+ regulation re sanitation + value chain)

Thank you for listening

ORGANIC PLUS

AARHUS UNIVERSITY

BlightManager

EuroBlight
A potato late blight network for Europe