BLIGHT MANAGEMENT
DSS FOR CONTROL OF POTATO LATE BLIGHT
EXPERIENCES FROM DENMARK

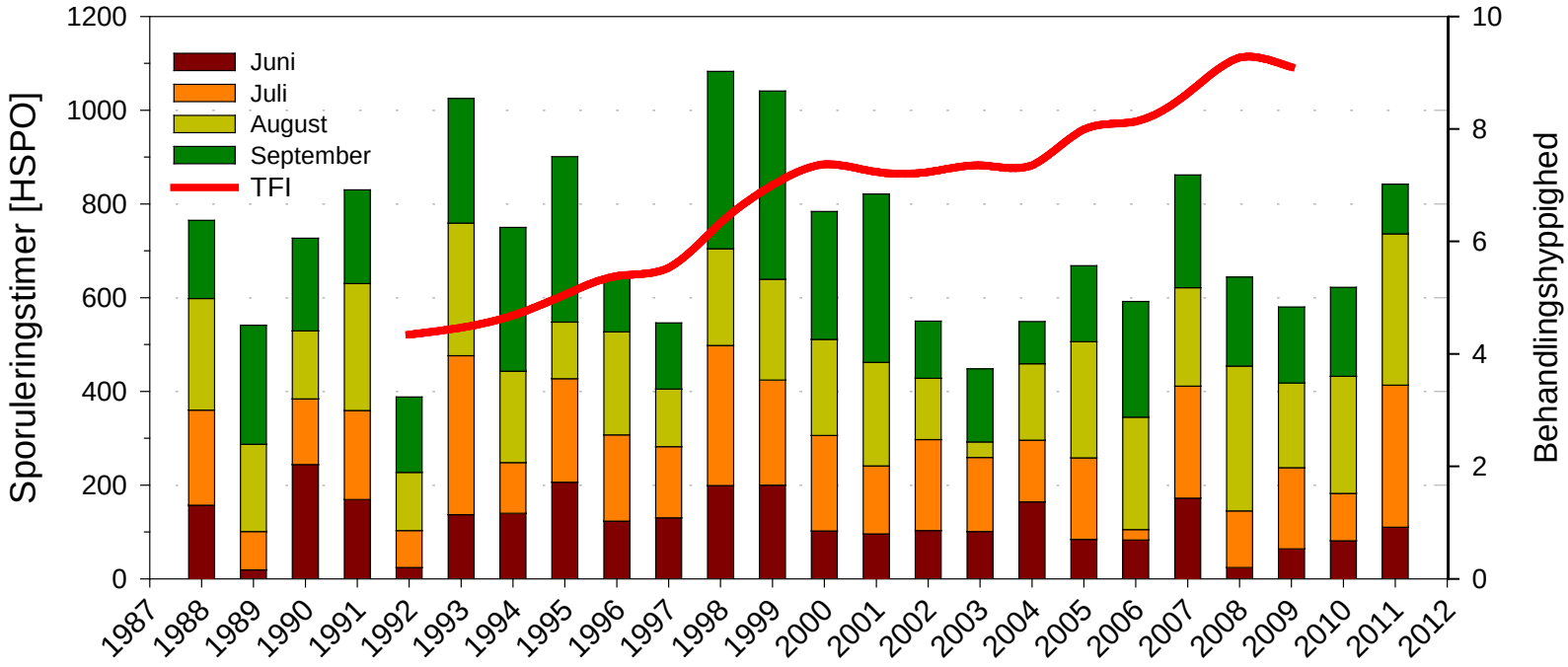
BENT J. NIELSEN, JENS GRØNBECH HANSEN & LARS BØDKER
AARHUS UNIVERSITY & KNOWLEDGE CENTRE FOR AGRICULTURE

UNIVERSITET

Potato FAQ….

- How close is late bligt to my area/field
- Is it ”blight weather” now?
- ”Blight weather” the comming days?
- Is it time to adjust/change strategies?
- Need for effective preventive fungicides?
- Need for curative actions?
- Can I save money?

National concerns…



- Increasing use of fungicides
- Farmer economy
- Danish potato production

Decission support

- Possibility to reduce fungicide input

- Effective disease control
- Improvements in control strategies
- Same or higher net yield

- Research and developpment supported by
  - Danish Potato Council (KAF)
  - Ministry of Environment
  - Ministry of Agriculture (NaturErhvervstyrelsen)

Blight Management

Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen

- Decission support system for control of potato late blight (*Phytophthora infestans*)
- Support to potato growers and advisors
- Information and forecast system
  - Monitoring of first attack and spread of LB
  - Weather forecast
  - Prognosis for potential infection pressure
- Recommendations
  - Recomended dose level depending on risk (not public yet)
- www.landbrugsinfo.dk (www.skimmelstyring.dk)

AARHUS
UNIVERSITY

Occurrence of late blight

Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen

- No attack in country
- Attack in country
- Attack in region
- Attack in field

Recordings from advisors that frequently are visiting potato fields
Red: New infections. Blue: > 10 days old

Monitoring network

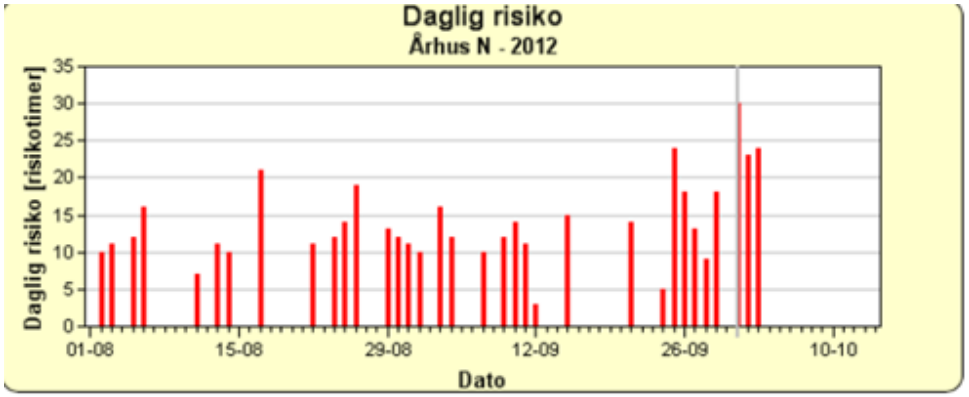
www.landbrugsinfo.dk

AARHUS
UNIVERSITY

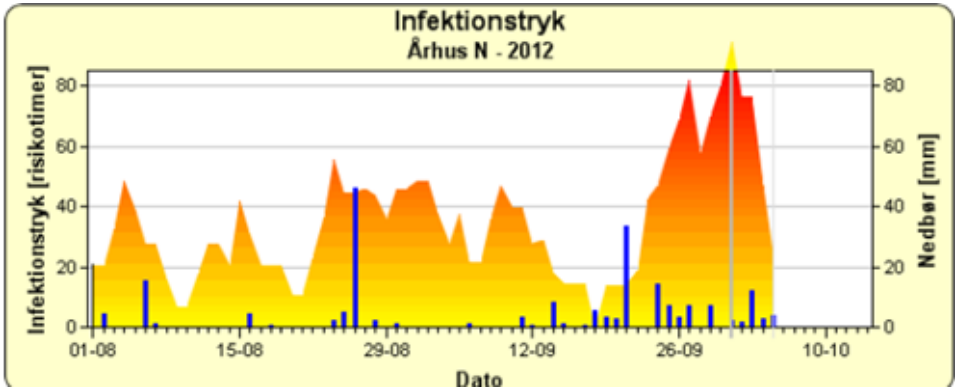
Infection pressure

Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen

Local weather
- Temperature
- Rh
- Hourly values
- **4 days weather forecast**



Daily risk values (HSPO, hours/ day):
- Temperature > 10C
- RH > 88 %

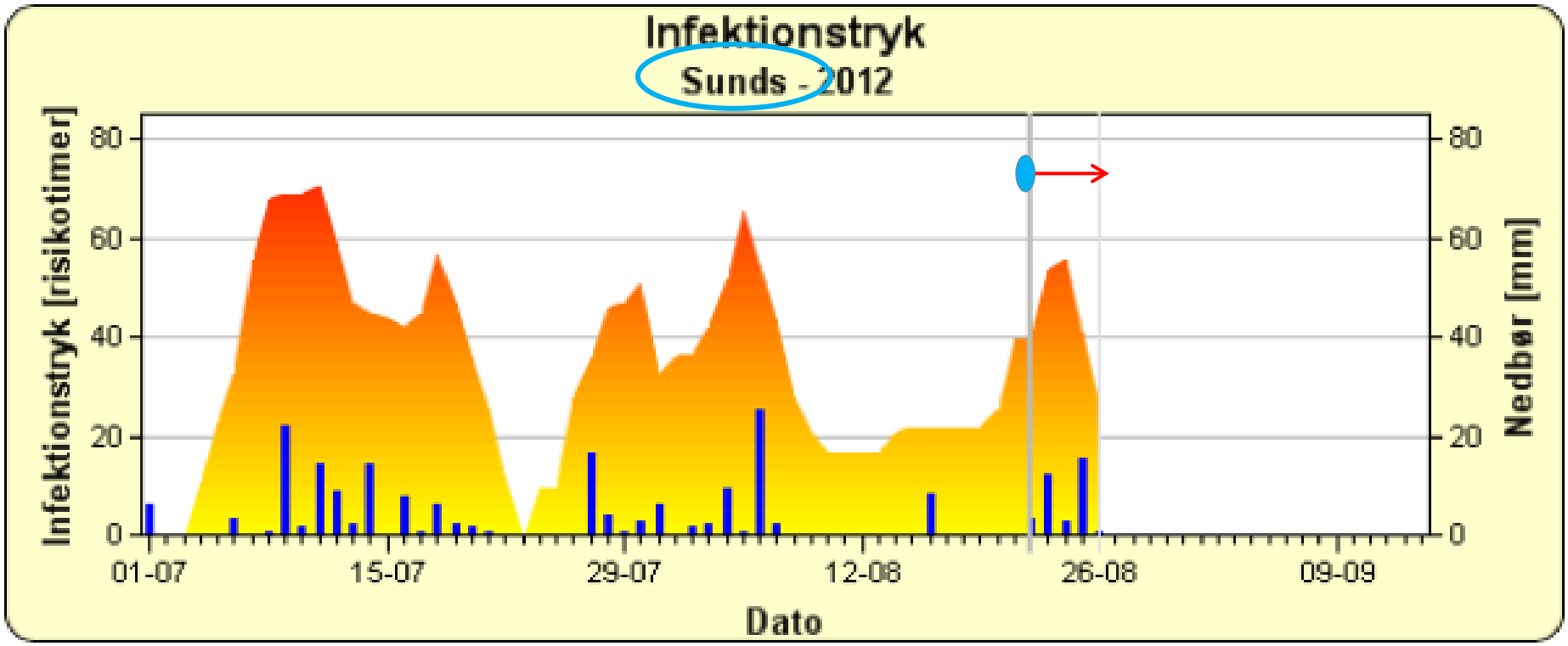


Sum HSPO: (running mean)
Prognosis for the day and comming 4 days

Estimate of spore production, spread and infection

AARHUS
UNIVERSITY

Infection pressure

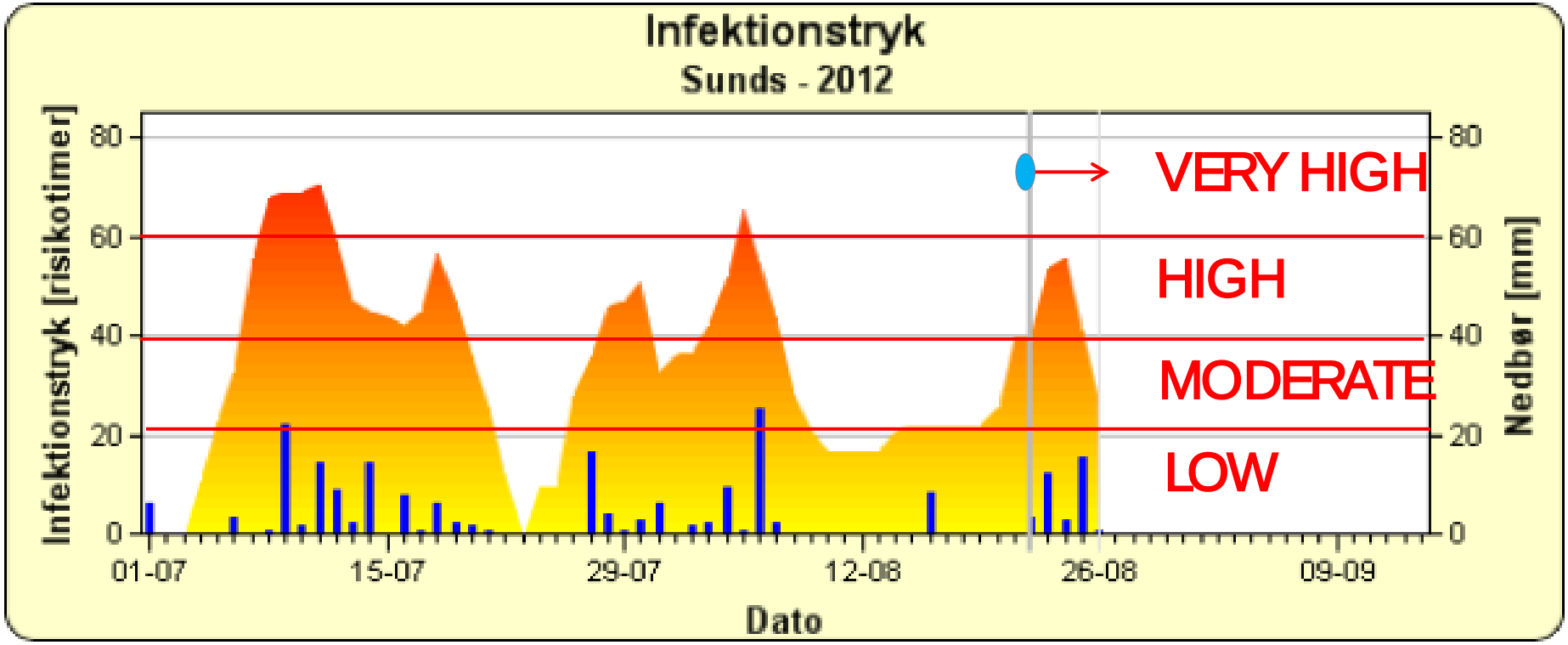


Historical data
Actual day
4 days forecast

AARHUS
UNIVERSITY

Local risk level

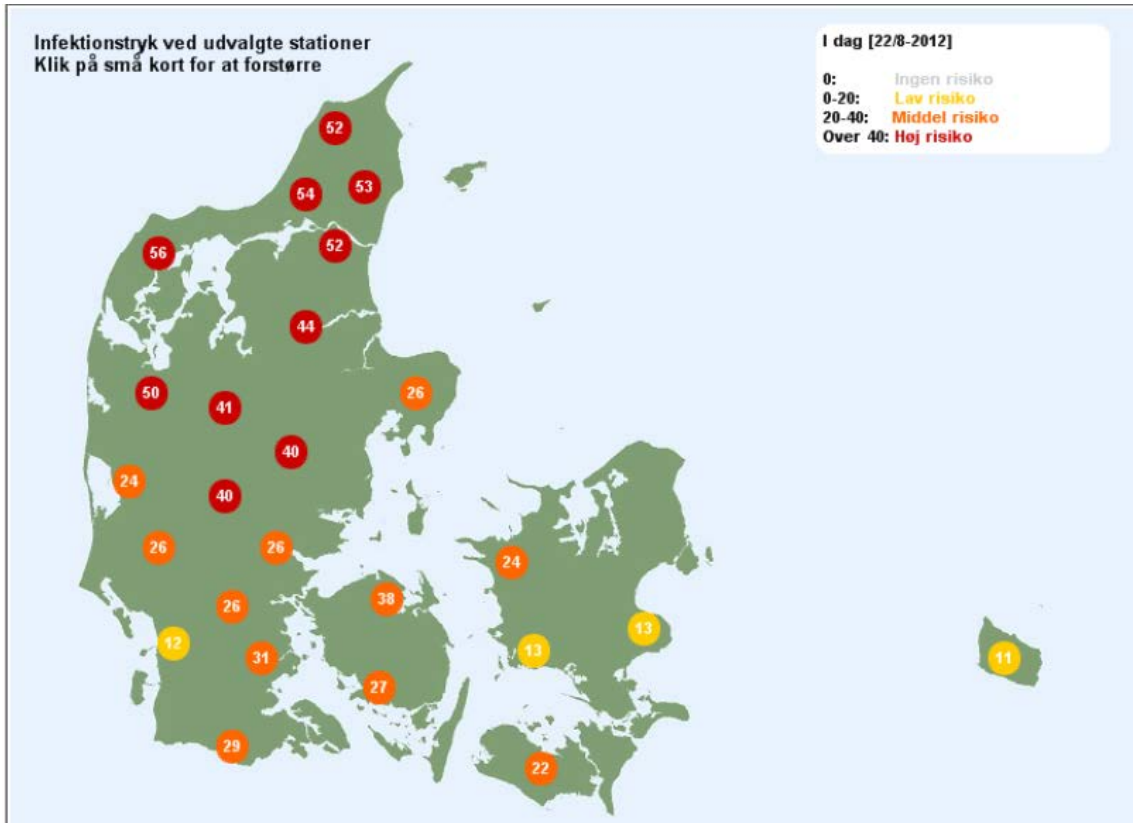
Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen



AARHUS
UNIVERSITY

Regional risk levels

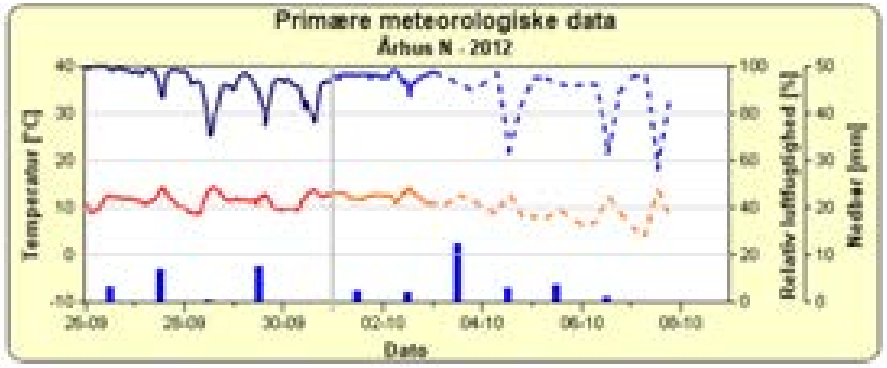
Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen



AARHUS
UNIVERSITY

Weather data

Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen



Rh, temp and precipitation historical values and 7 days prognosis
(Danish Met. Office)

Regional weather forcast
(Danish Met. Office)

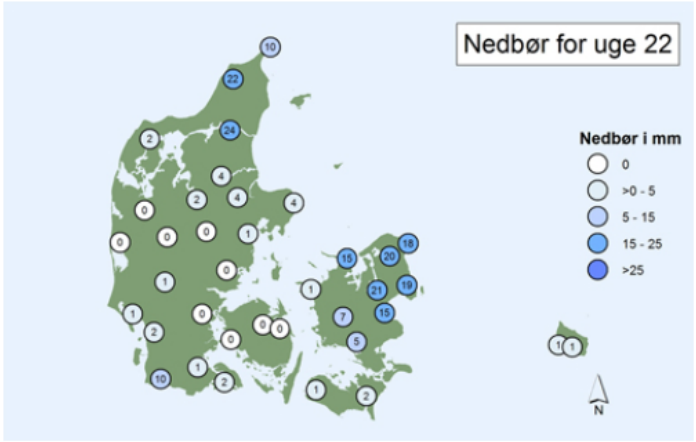
Actual day

AARHUS
UNIVERSITY

Weather data

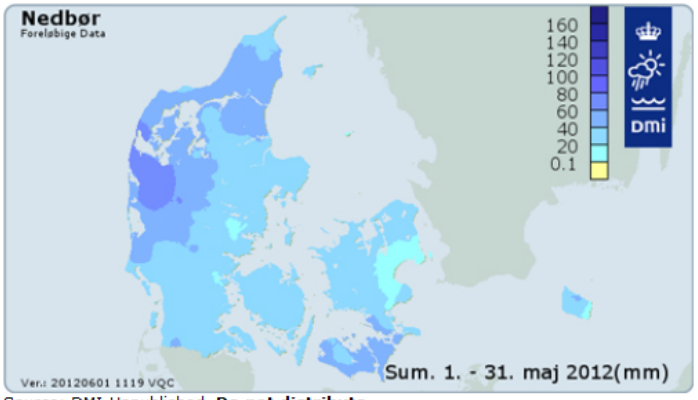
Skimmelstyring
Reduceret ressourceforbrug, optimering og værdiløft i kartoffelproduktionen

Status for precipitation



Source: DMI-Ugenedbør. Enlarge map: week 22 (28/5 - 5/6)
week 21 (21/5 - 28/5) week 20 (14/5 - 21/5)
week 19 (7/5 - 14/5) week 18 (30/4 - 7/5)

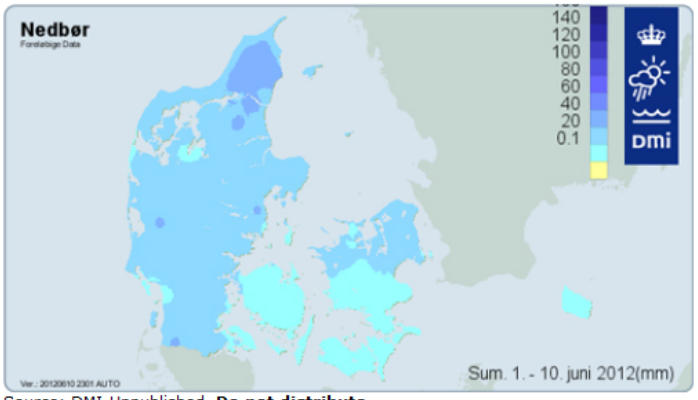
May



Source: DMI-Unpublished. **Do not distribute**

Actual week

Given period

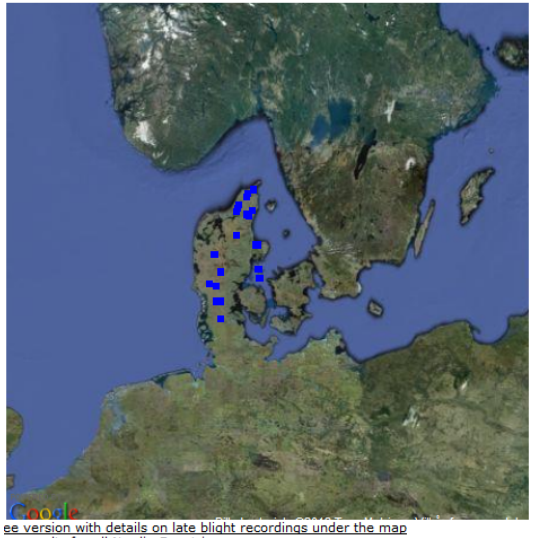


Source: DMI-Unpublished. **Do not distribute**

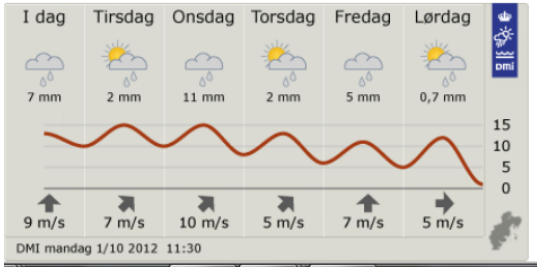
Distribution of precipitation on a daily basis:
7 May 8 May 9 May 10 May 11 May 12 May 13 May 14 May 15 May 16 May
17 May 18 May 19 May 20 May 21 May 22 May 23 May 24 May 25 May
26 May 27 May 28 May 29 May 30 May 31 May 1 June 2 June 3 June 4 June
5 June 6 June 7 June 8 June 9 June 10 June

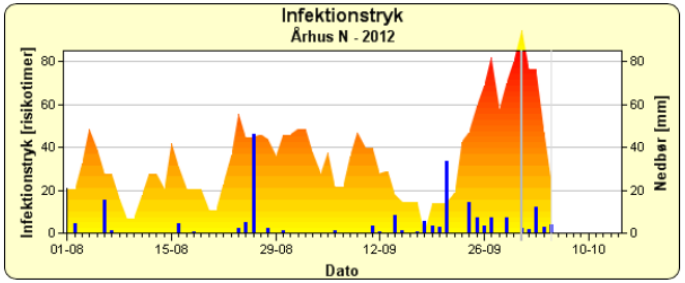
Yderligere skal vises xxx:

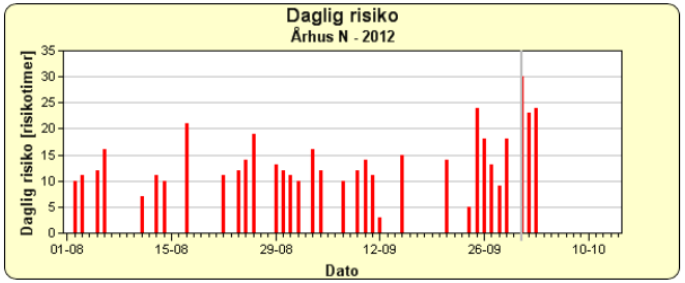
Available tools at www.landbrugsinfo.dk

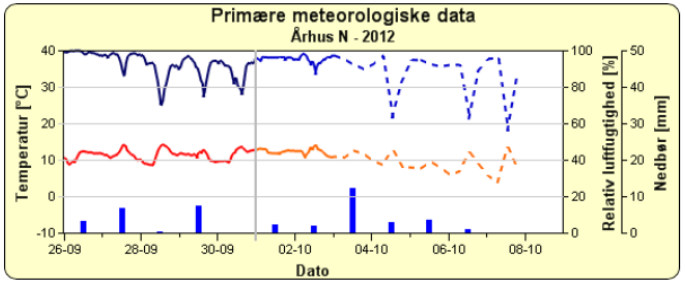


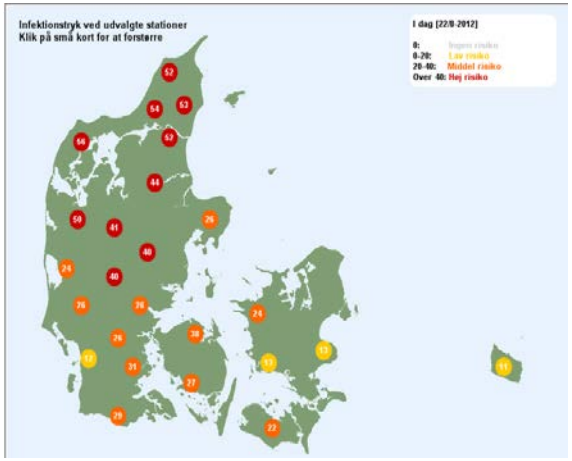
ee version with details on late blight recordings under the map
ee results for all Nordic Countries

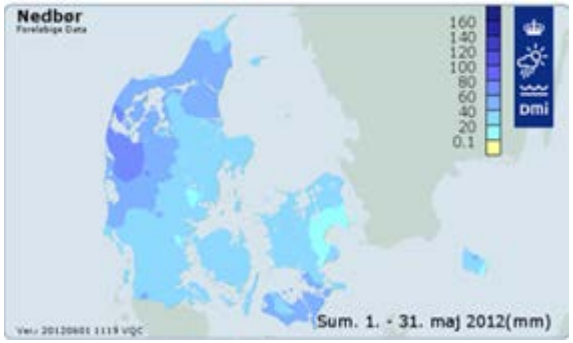




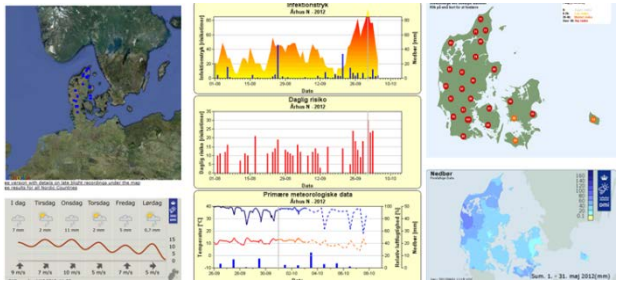








Use of information



- Farmers
- Starch producers
- Advisors
- National advisory service

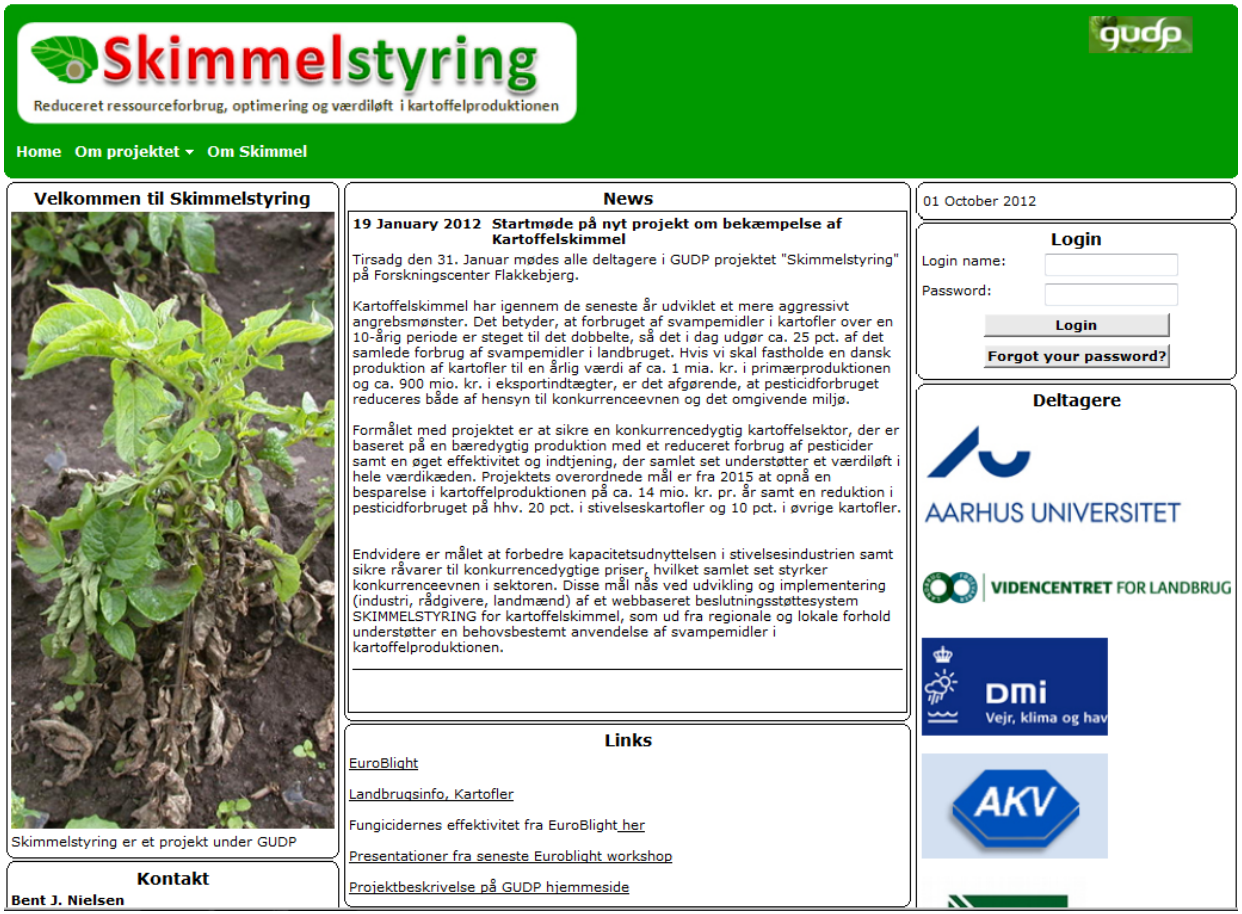
Decission support

- ✓ Background information combined with other information
- ✓ Support not decission model (!)
- ✓ Recommendations and newsletters to farmers
- ✓ Wekly advisor telephone meetings in the season (Monday)

AARHUS
UNIVERSITY

Toolbox on development platform

Different applications under development



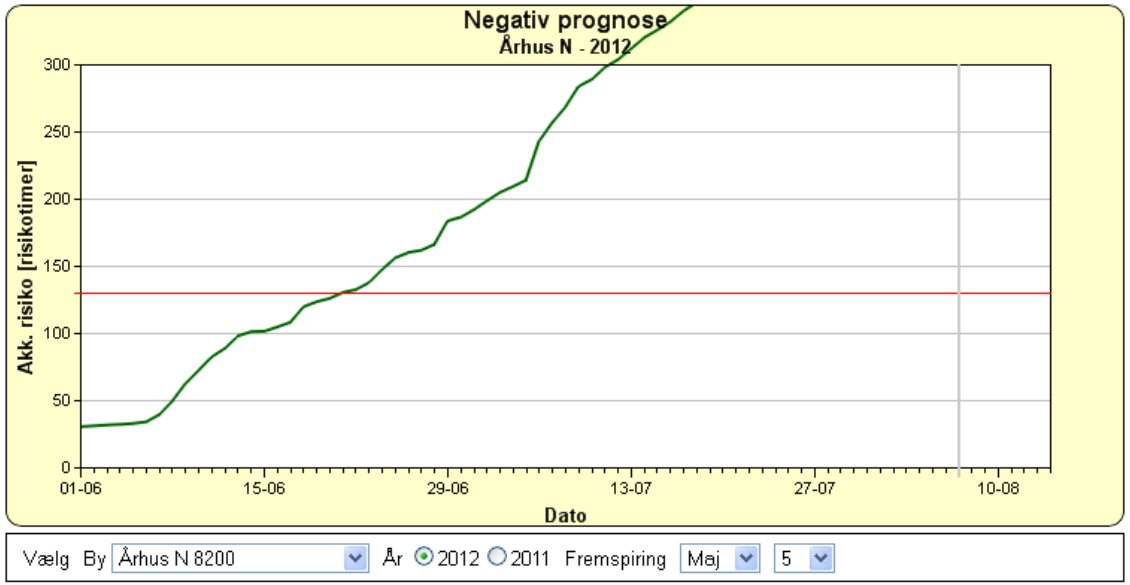
www.skimmelstyring.dk

GUDP project platform

Development tools for the project

AARHUS
UNIVERSITY

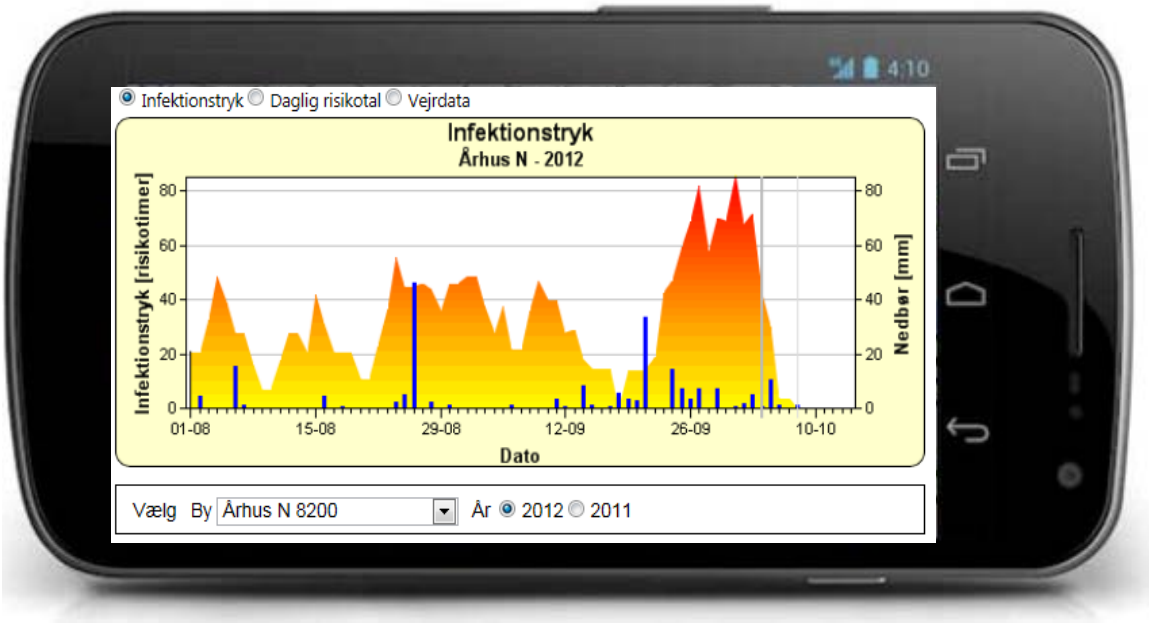
Toolbox: Negativ prognosis



Model to forecast risk of late blight outbreak (values>130) (Ullrich and Schrodter)

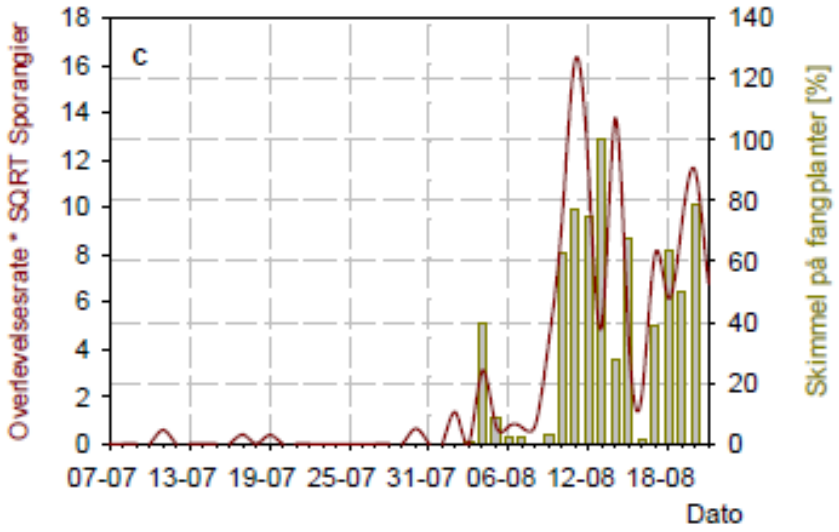
- Temperature, Rh, and rainfall (starting at crop emergence)
- Accumulated risk values
- Can bee used predict the timing of the first treatment.
- Model assumes the same amount of initial inoculum is present every year
- Old model that just needs to be implemented and explained

Toolbox: Smartphone applications



Local Infection pressure available as application on smartpone (demo version)

Toolbox: Index for survival of sporangia

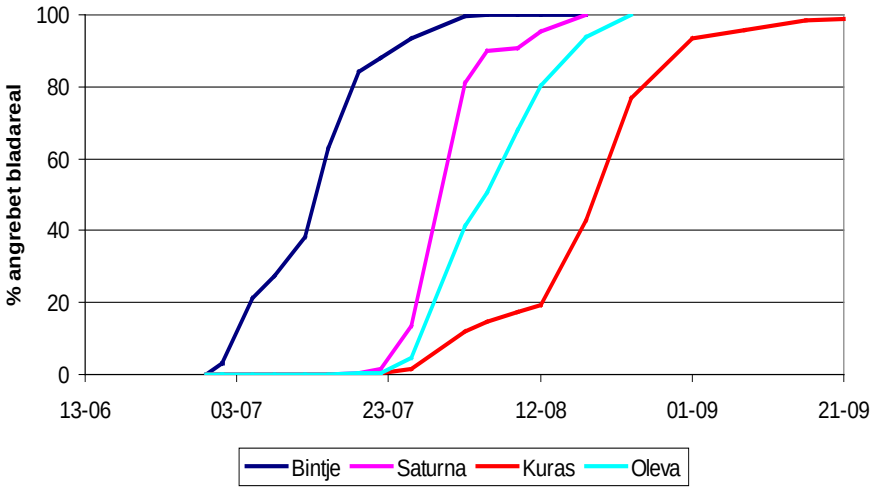


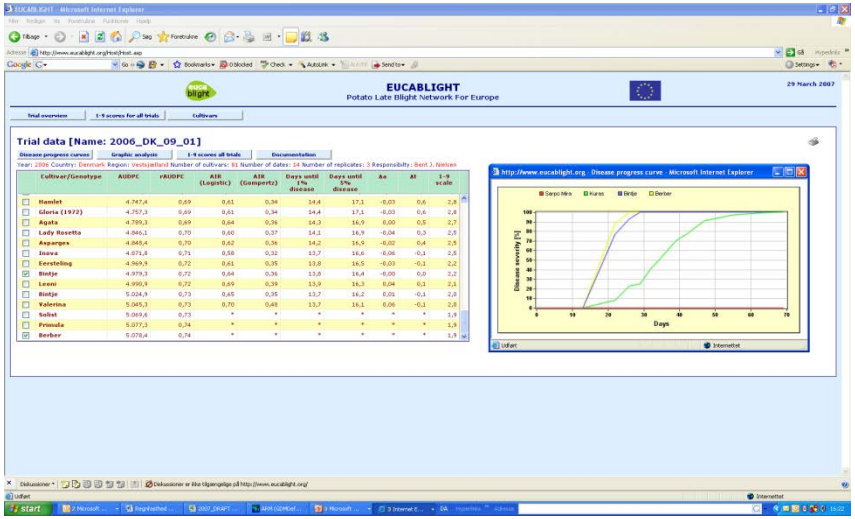
Survuival of sporangia depends on global radiation (UV)

- Infection risk = survival rate x sporangia
- UV radiatioin + prognosis for UV radiation

Toolbox: Resistance level in varieties

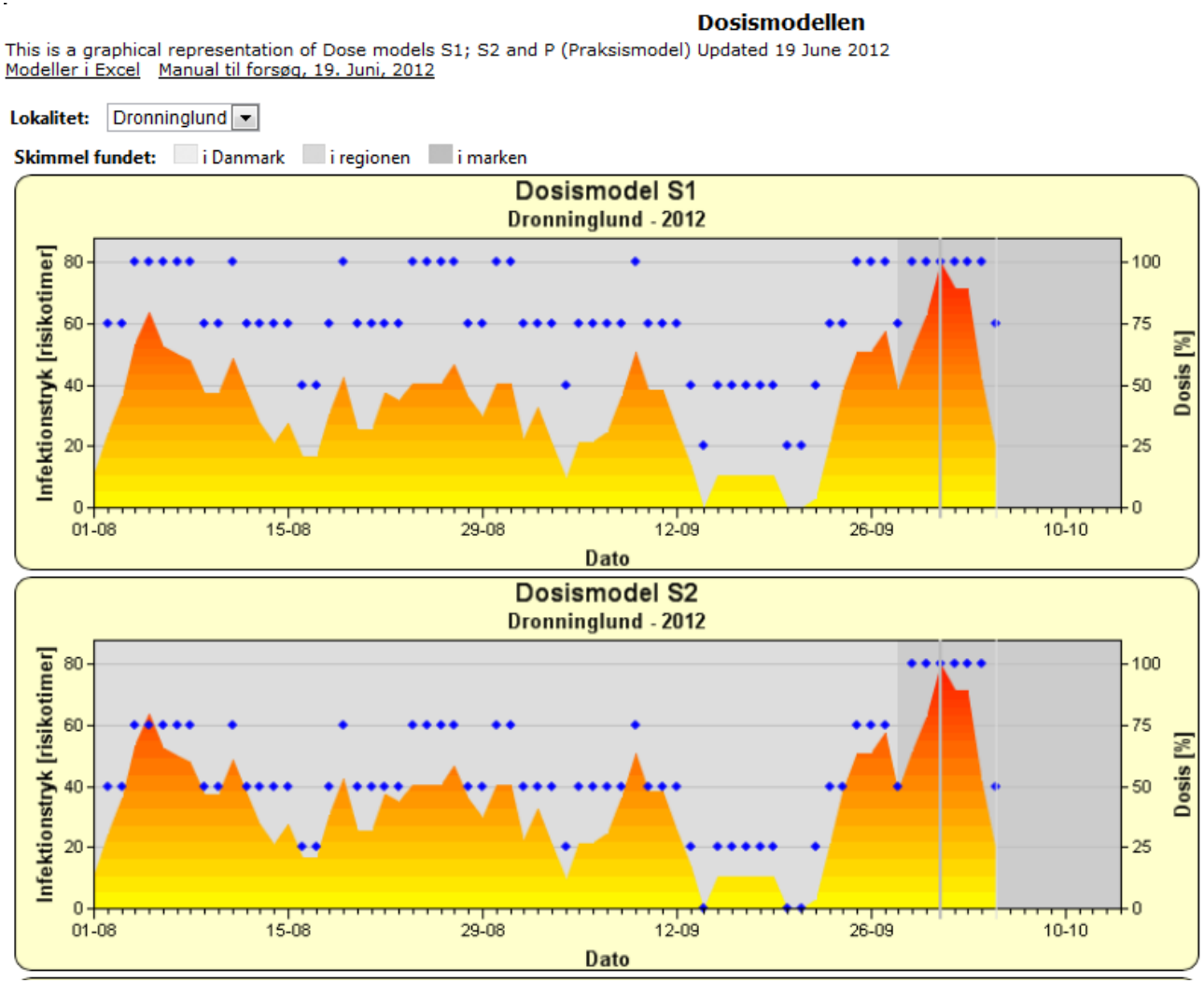
- Susceptible
- Moderate resistant. Higher level beginning of season (Kuras)





Test after Eucablight protocol.
No trials for the moment

Toolbox: Fungicide dose model



Dose varies depending on risk situation (actual and coming days)

Fungicide dose model

- Use of fungicides (dose x intervals) depend on risk situation (actual and coming days):
- **Recommended actual dose:**

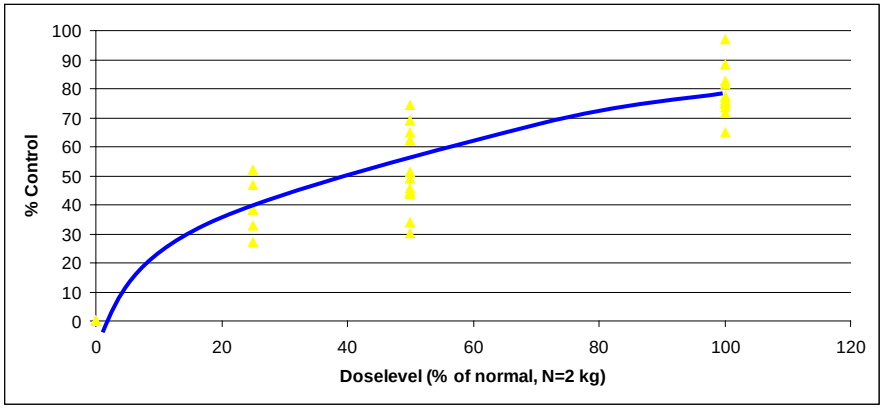
  Infection pressure x occurence of LB x level of resistance

- No or low risk of infection: No spraying or low dose of **effective** fungicides
- Increasing risk of infection: Dose of **effective** fungicides depends on actual risk

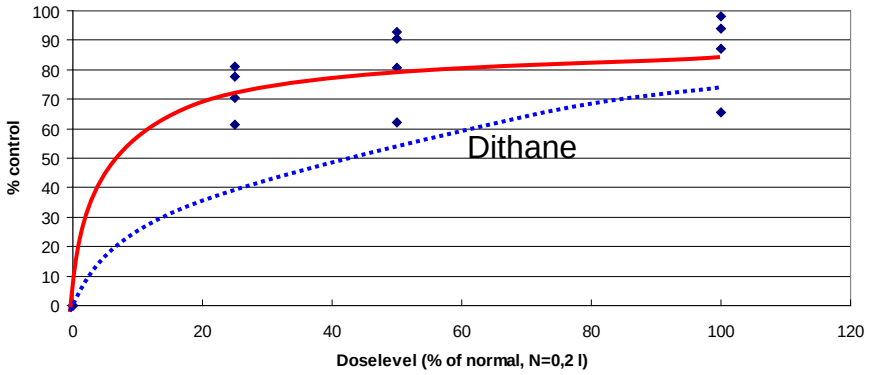
AARHUS
UNIVERSITY

Dose-response curves for potato fungicides, examples

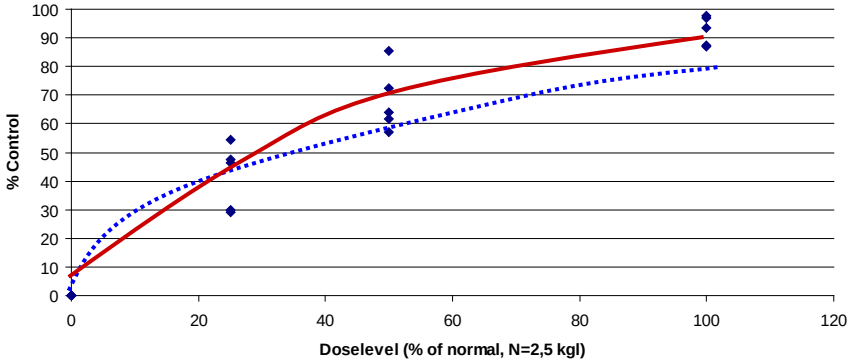
Dithane



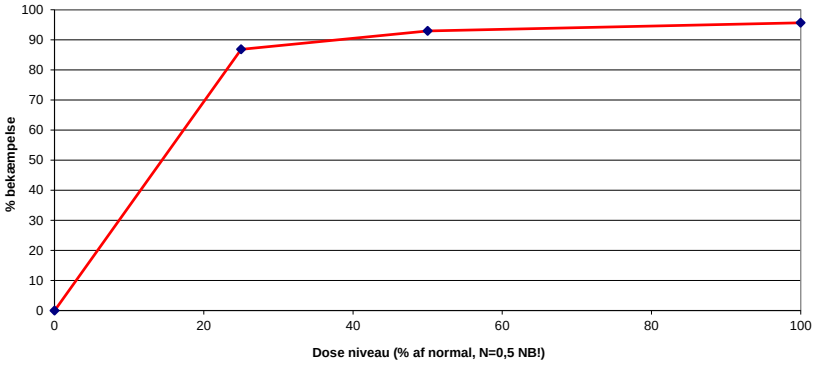
Ranman



Curzate M



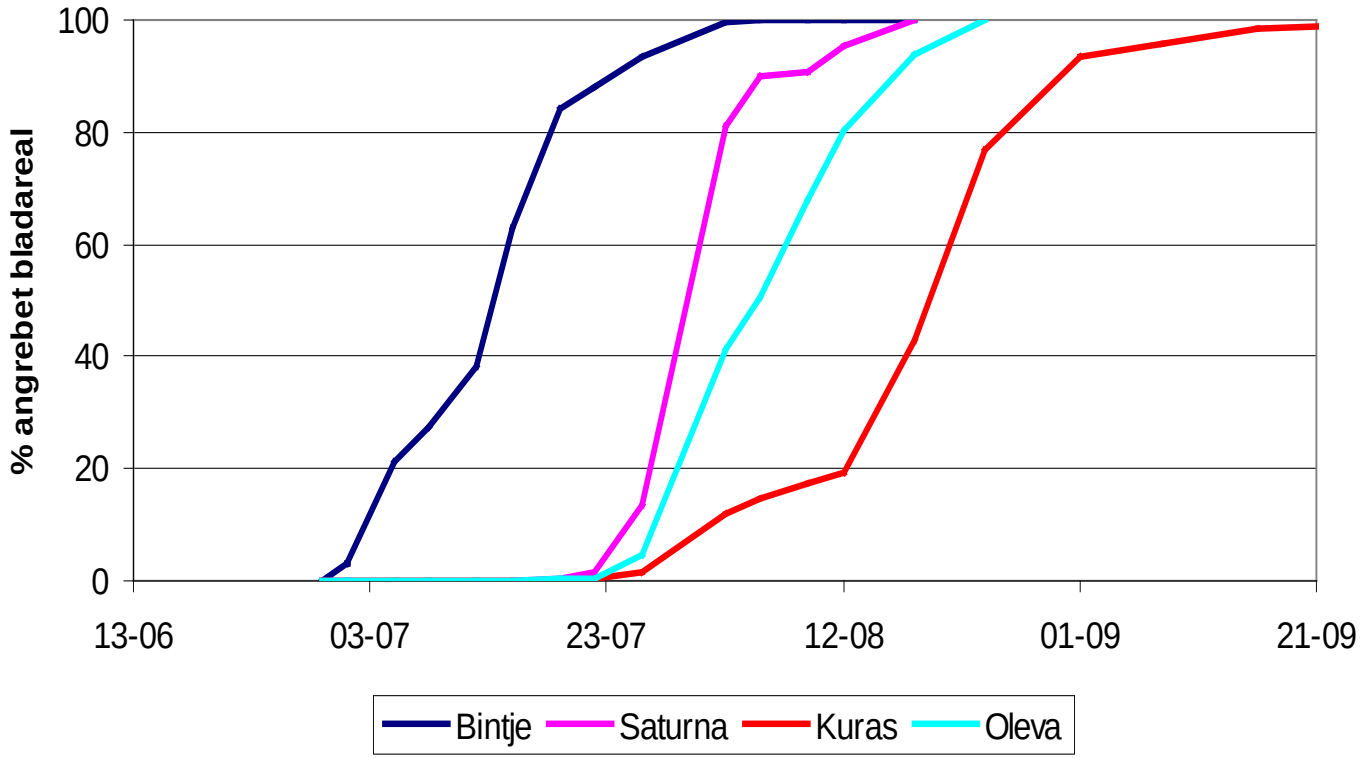
Revus



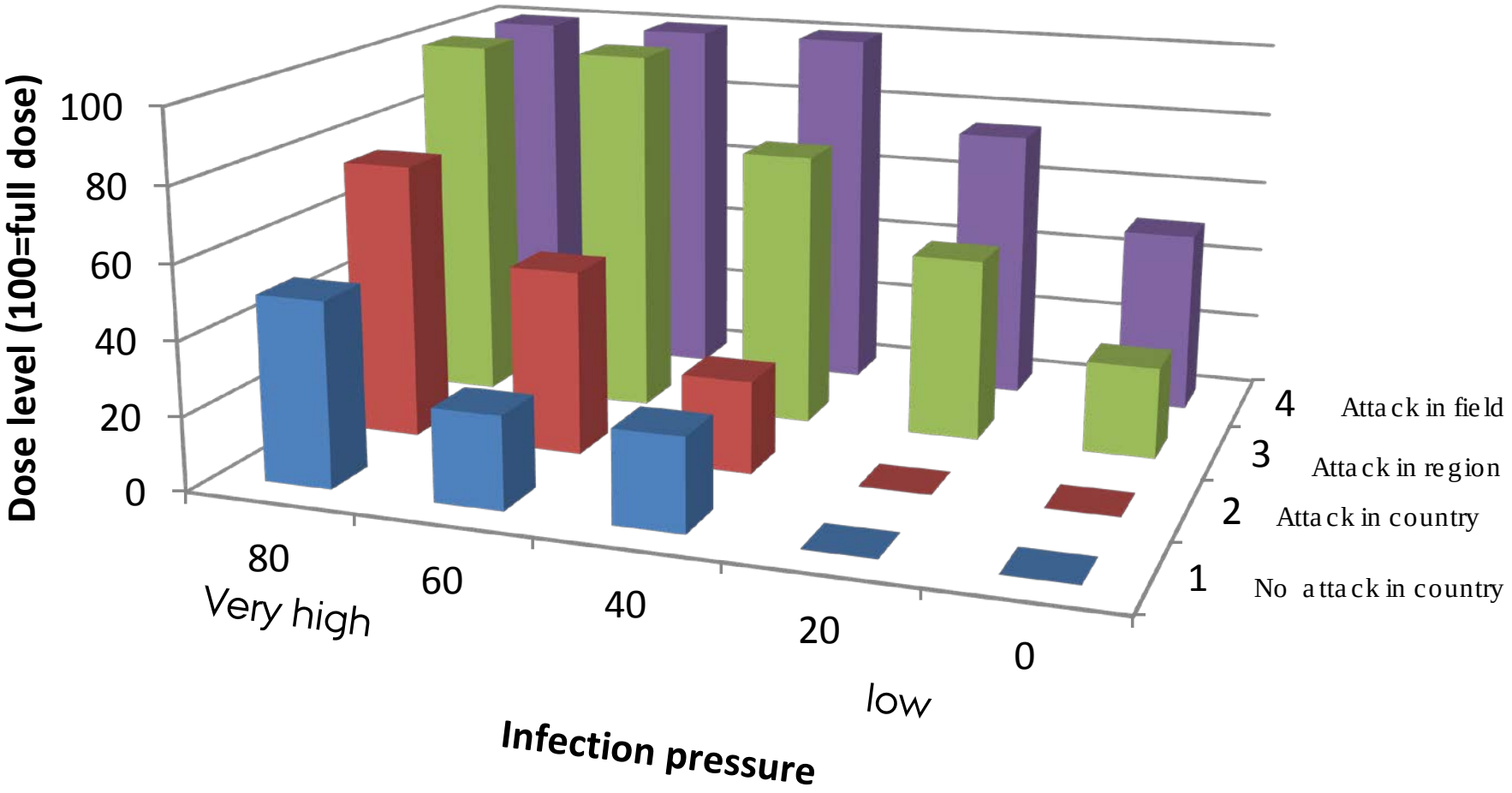
AU, Flakkebjerg 12 sprayings, 7 days intervals

Resistance level in varieties

- Susceptible
- Moderate resistant. Higher level beginning of season (Kuras)



Fungicide dose levels in model

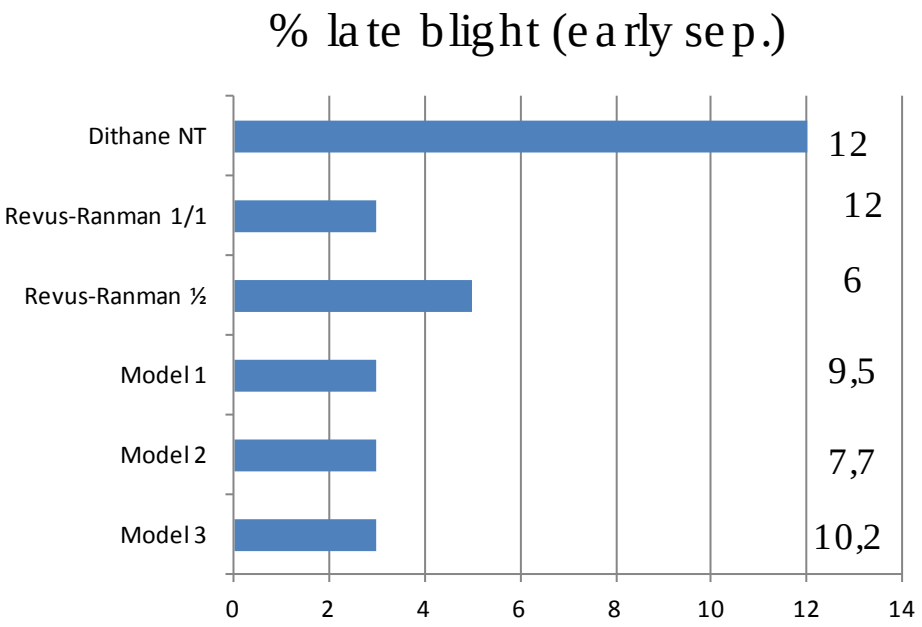


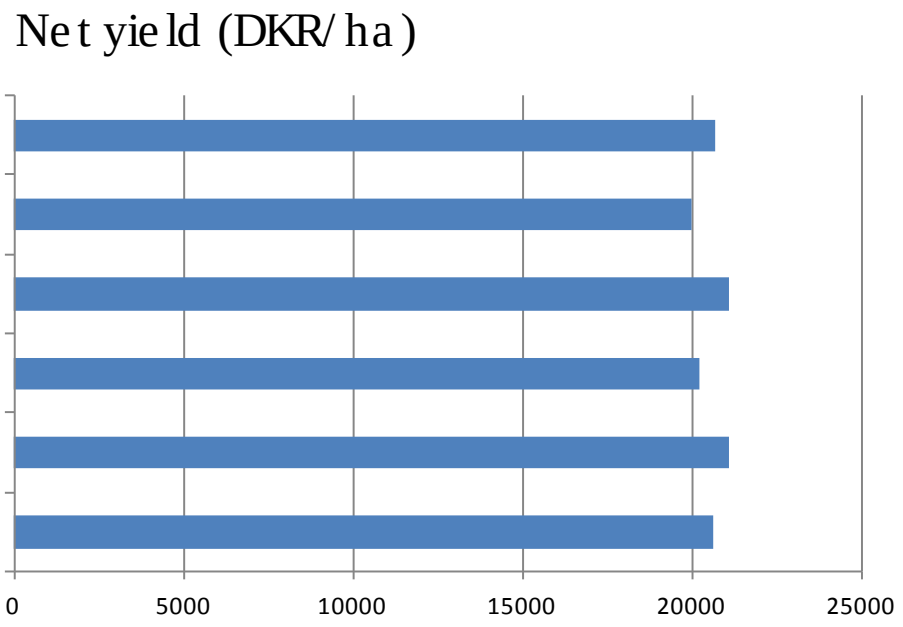
Field trials with dose models 2009-2011

1.	Dithane NT	2 kg/ha
2.	Ranmen – Revus	1/1 dose
3.	Ranman – Revus	½ dose
4.	Model 1	Reduced dose especially early season
5.	Model 2	Dose further reduced
6.	Model 3	As model 1 but includes Dithane NT

Varietry: Kuras (starch variety)
Locations: 3 (Flakkebjerg, Herning & Try)

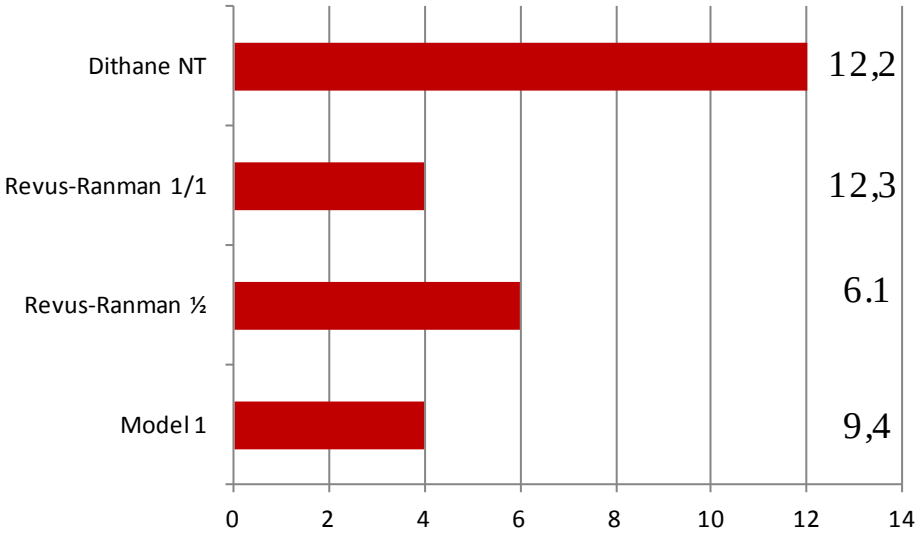
9 trials 2010-2011

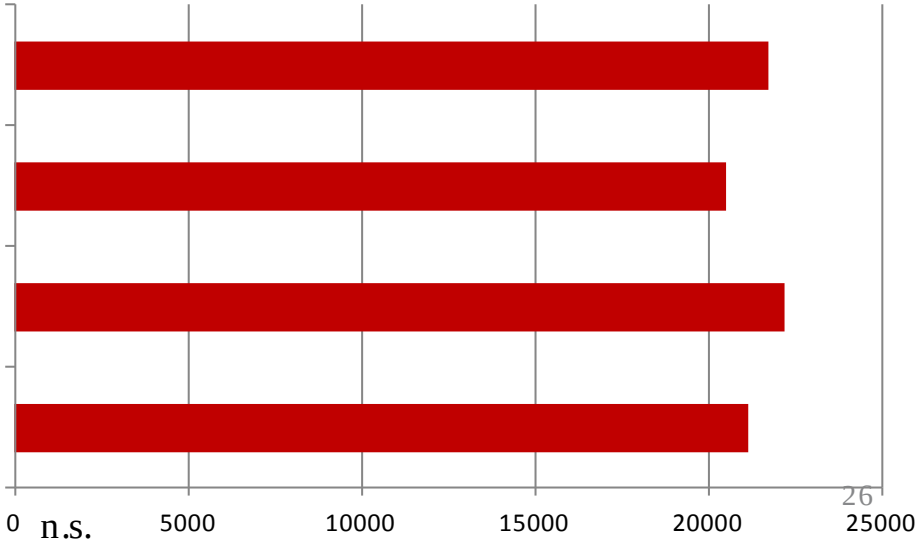




n.s.

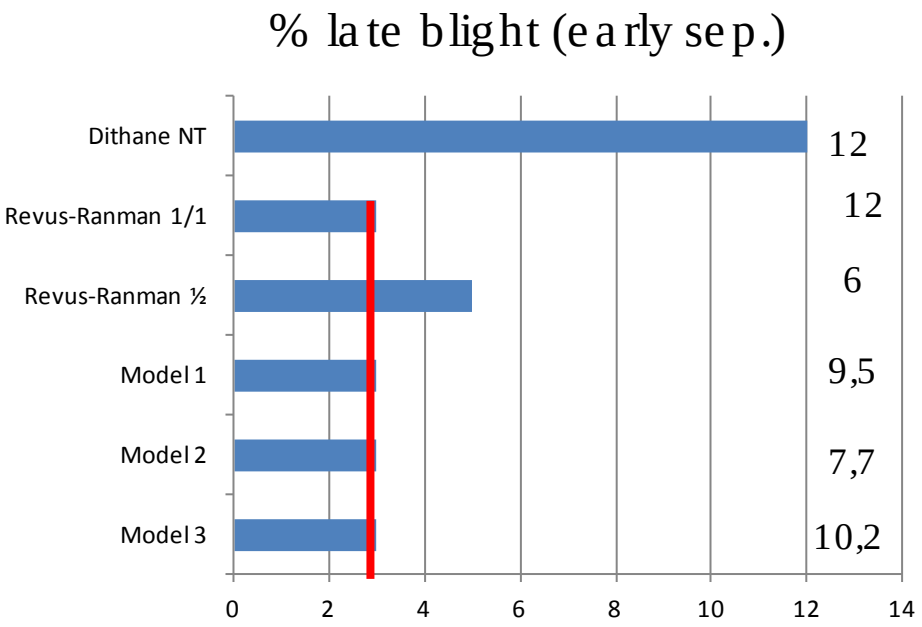
12 trials 2009-2011

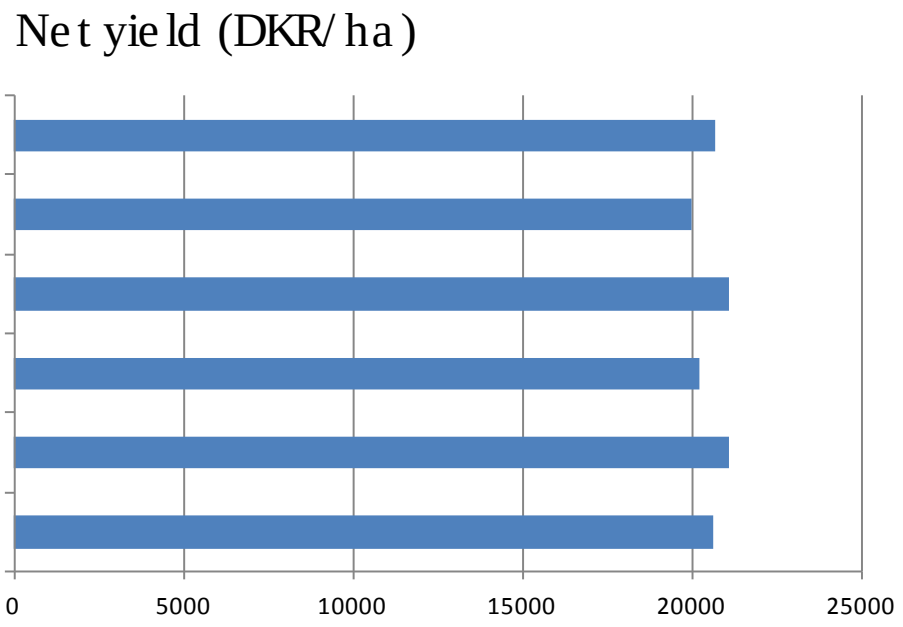




n.s.

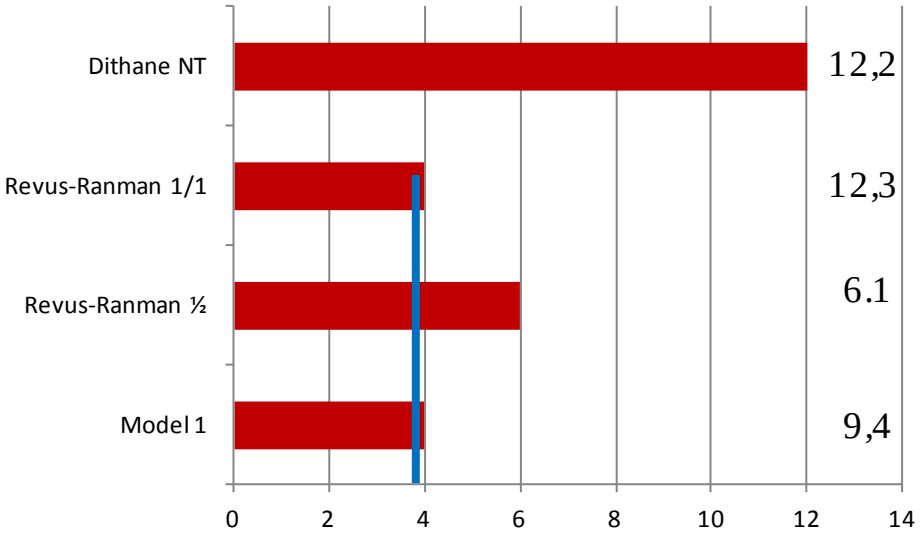
9 trials 2010-2011

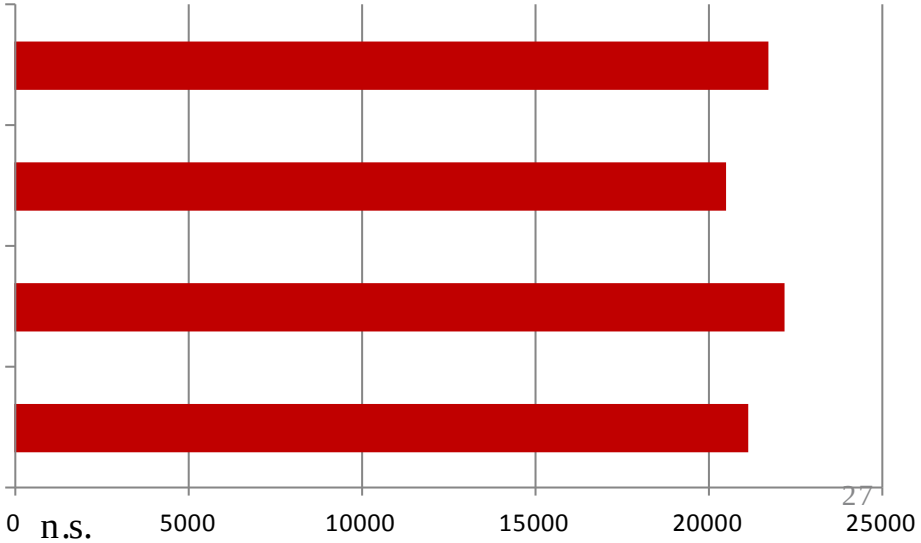




n.s.

12 trials 2009-2011

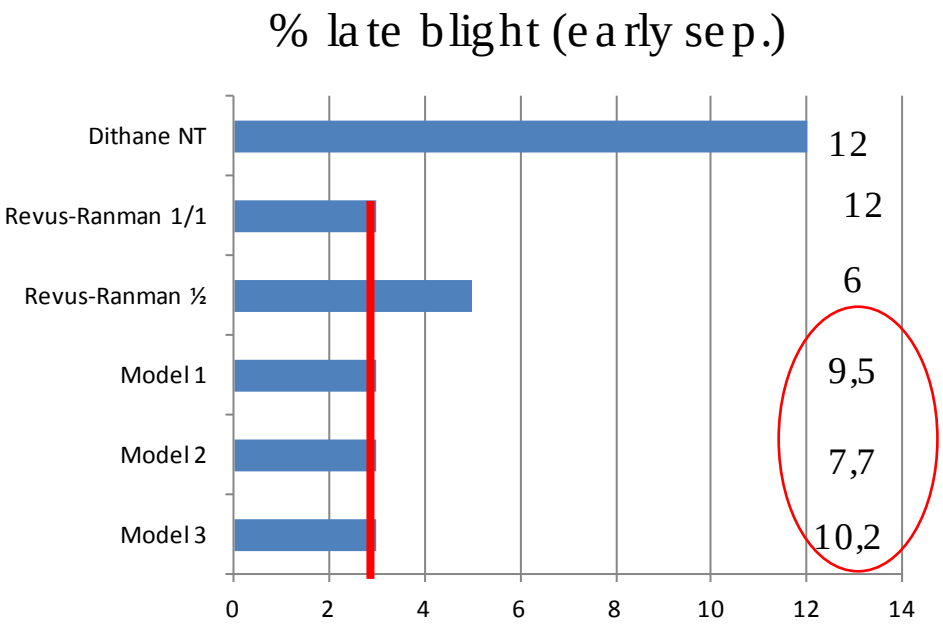


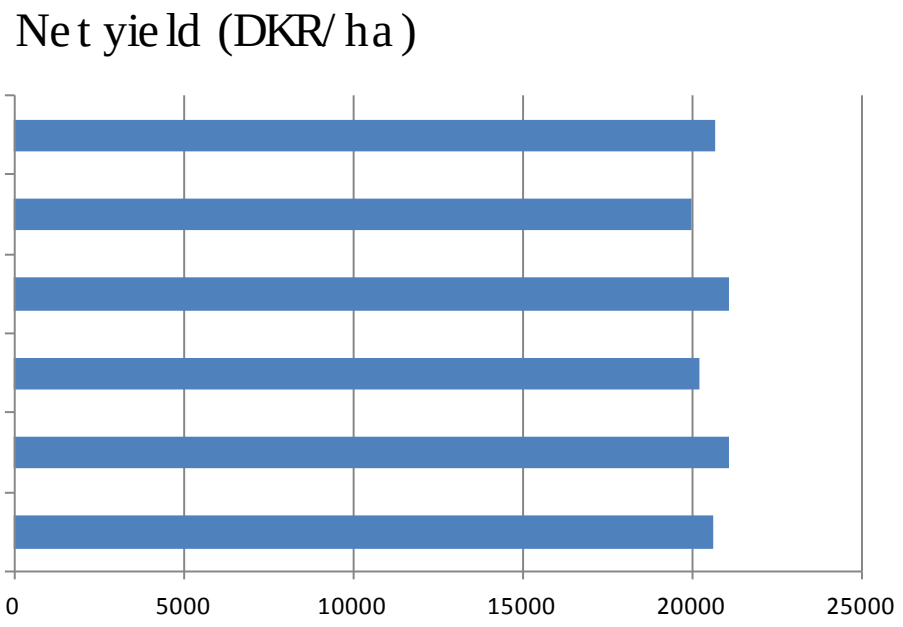


n.s.

9 trials 2010-2011

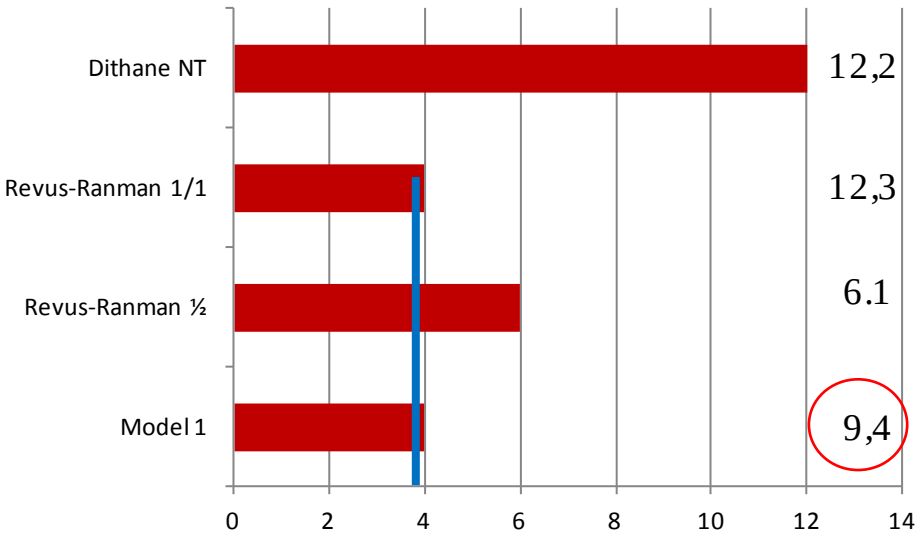
TFI

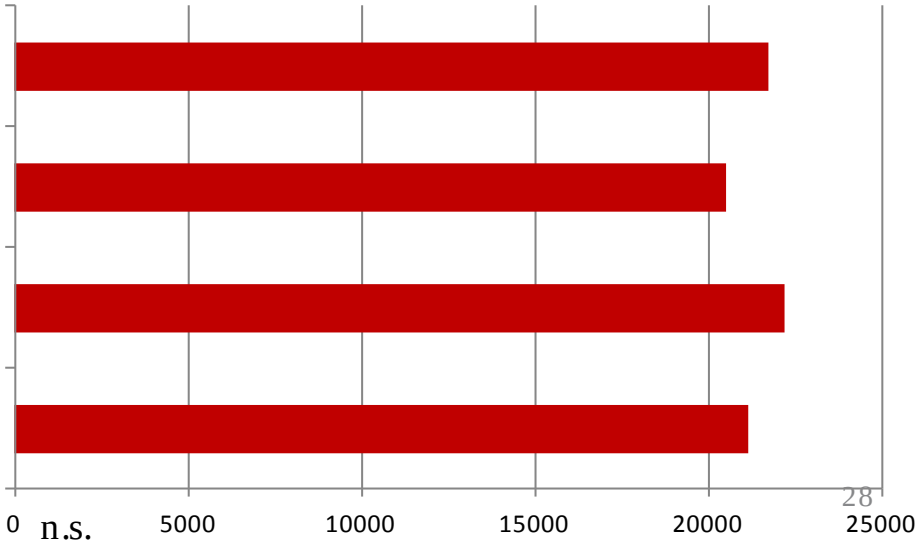




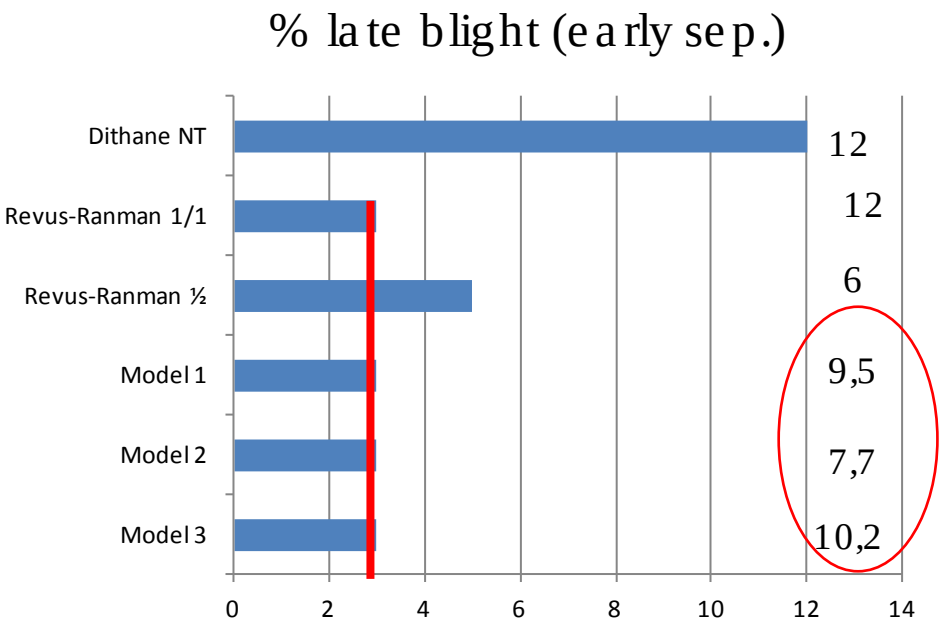
n.s.

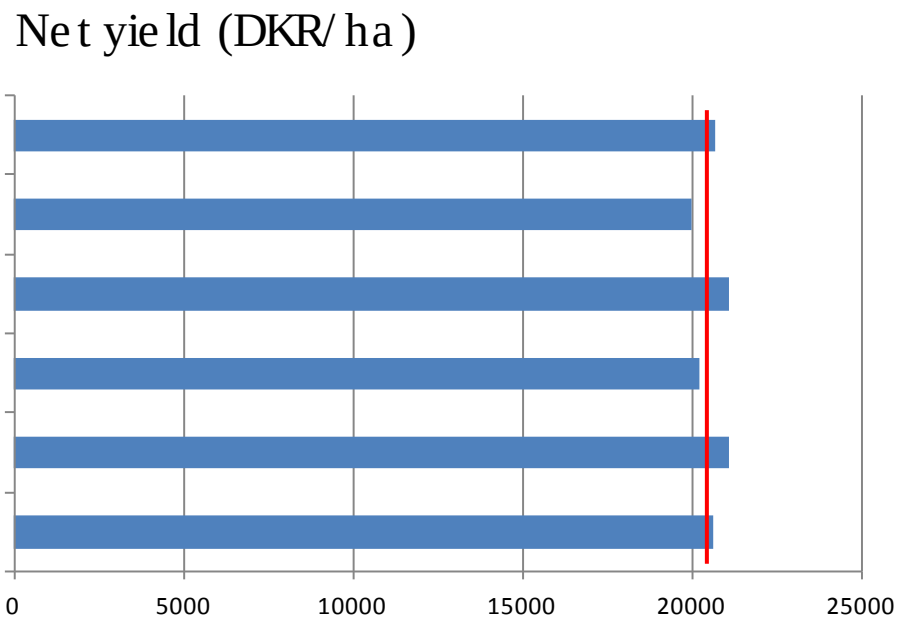
12 trials 2009-2011





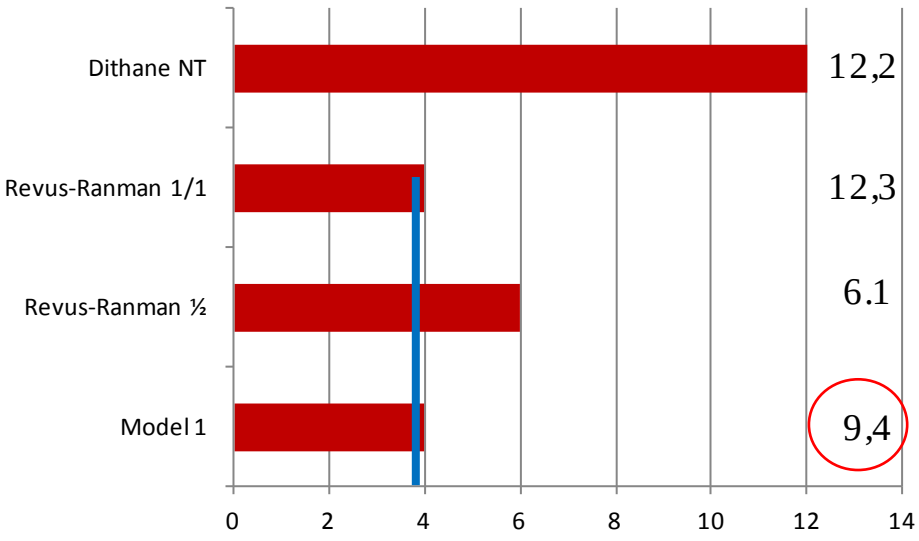
9 trials 2010-2011

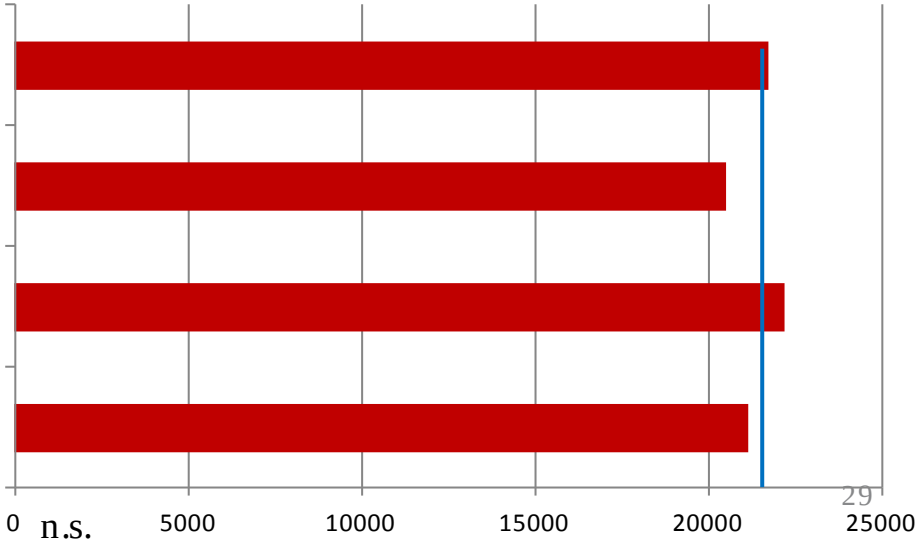




n.s.

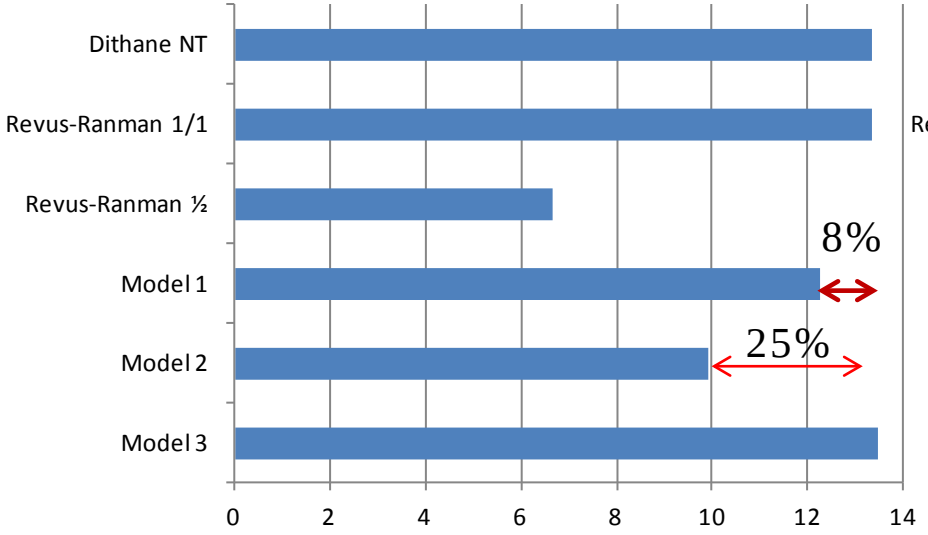
12 trials 2009-2011



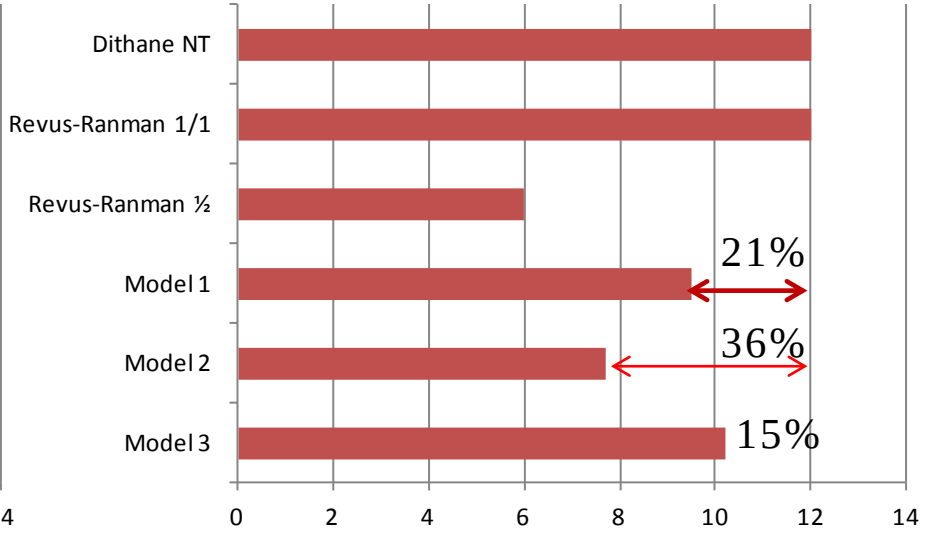


Treatment frequency index *)

3 trials 2011



9 trials 2010-2011

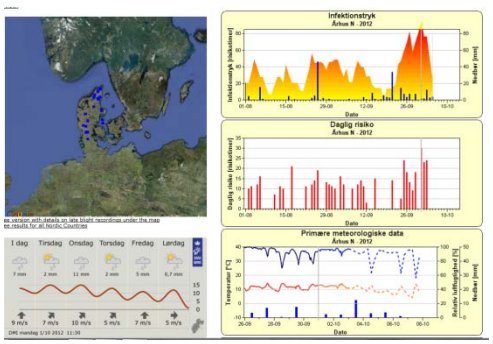


Reduction 0-25%
(favorable blight conditions)

Reduction 15-36%

*) number of times sprayed with standard dose (e.g. 4 x ½ = 2)

Summary: Blight Management



- Monitoring system works and shows the first attacks and spread of LB
- Calculation of infection pressure works
- Level reflects periods with low and high LB disease pressure (experienced from practice)
- Basis for adjusting strategies and timing of curative products

Summary: Dose model

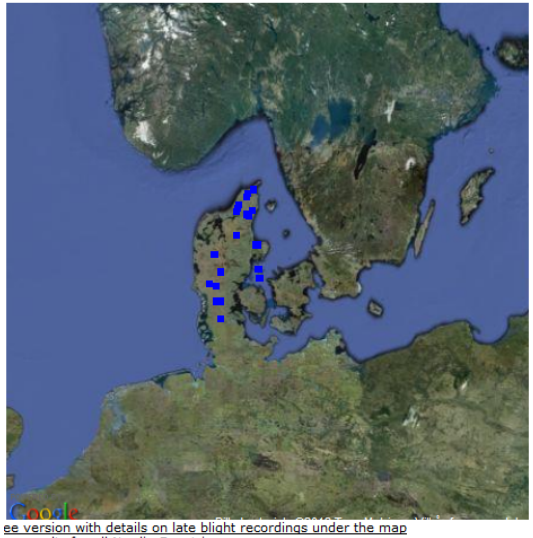
- Still a research model
- Basis for reduction in fungicide input (approx.30%)
- Same or better LB control as full standard dose
- Same net yield as standard rutine
- Improvements: Alternaria modul
  New fungicides (prev./ cur.)
  Early start

Blight Management

LandbrugsInfo

Print

Søg



ee version with details on late blight recordings under the map
ee results for all Nordic Countries