

Management of Late Blight With BlightManager DSS

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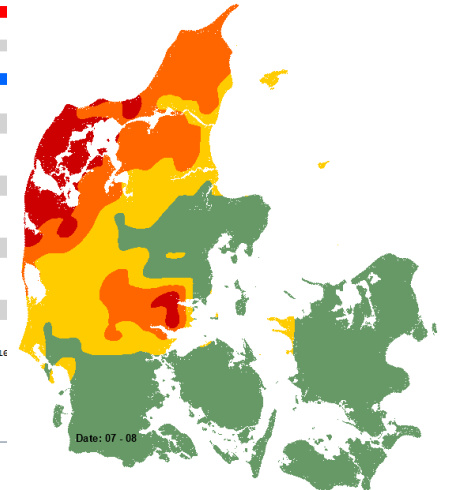


AARHUS
UNIVERSITY

DEPARTMENT OF AGROECOLOGY

IPM 3.0-putting everything together

Weather based DSS for timing and choice of product



Precision agriculture to optimise field operations



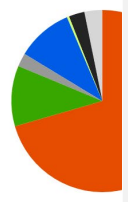
Best management practice

Best Management Practice: Organic – phase 1
 Potatoes in every 5-6 potatoes
 Use certified seed. Consider alternate host plants infected mother plant
 Early sowing and minimum steep ridges to prevent
 Consider split application the early season and senescence that is off
 Consider to use drip
 Use a more resistant important measure for production
 Use alternatives BAC resistant cultivars and products
 Use DSSs that include is adapted to organic
 Remove or burn the
 Harvest under dry conditions. Use a DSS to
 Remove infected tubers under conditions re temper

Product (Dose rate [litre or kg/ha])	Leaf blight	Tuber blight	New growth	Stern blight	Protectant	Curative	Anti sporulant	Rain-fastness	Mobility	Year
copper										1900
dithiocarbamates										
chlorothalonil										
cyazofamid (0.5)										
fluzianam (0.4)										
zoxamide + mancozeb										
amisuibrom + mancozeb										
ametoctradin + mancozeb										
fluzianam + azoxystrobin										
famoxadone + cyprothiazole										
zoxamide + mancozeb										
mandipropamid + benthialavalacarb										
benthialavalacarb + cymoxanil + metiram										
cymoxanil + cymoxanil + mancozeb										
dimethomorph + dimethomorph										
fenamidone + mancozeb										
zoxamide + cymoxanil + dimethomorph										
mandipropamid + pyraclostrobin										
benalaxyl-M + mancozeb										
metalaxyl-M + mancozeb										
metalaxyl-M + fluazinam										
propamocarb + cymoxanil										
propamocarb + cymoxanil + HC										
propamocarb-HC										
oxathiapiprolin										
oxathiapiprolin + mancozeb										
oxathiapiprolin + mancozeb										
oxathiapiprolin + mancozeb										

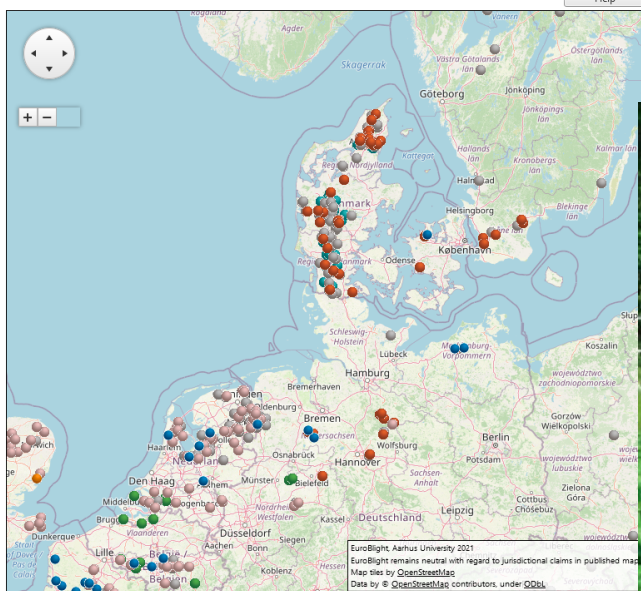
Surveillance & monitoring and infection risk on Dashboard

- Home
- About EuroBlight
- EuroBlight Zoom meetings 2021 - presentations
- Pathogen monitoring
 - About Pathogen Monitoring
 - Genotype Map
 - Genotype Frequency Map
 - Genotype Frequency Chart
 - Genotyping methods
- Control strategies
- Alternaria
- Late blight Survey Mapper
- News
- Workshop proceedings 1996-2015
- Research projects
- Protocols



Genotype Map

Year: 2020
 Continent: Europe
 Country: All countries selected
 Host: All, N/A, Other, Potato, Tomato
 Genotypes: All
 EU_1_A1, EU_2_A1, EU_6_A1, EU_8_A1, EU_12_A1, EU_13_A2, EU_23_A1, EU_36_A2, EU_37_A1, EU_39_A1, EU_41_A2, EU_43, EU_42_A2, Other
 Show



Disease surveillance and monitoring.

BlightTracker App

BlightTracker v. 5

Date: onsdag den 27. maj 2020

Location name: Try

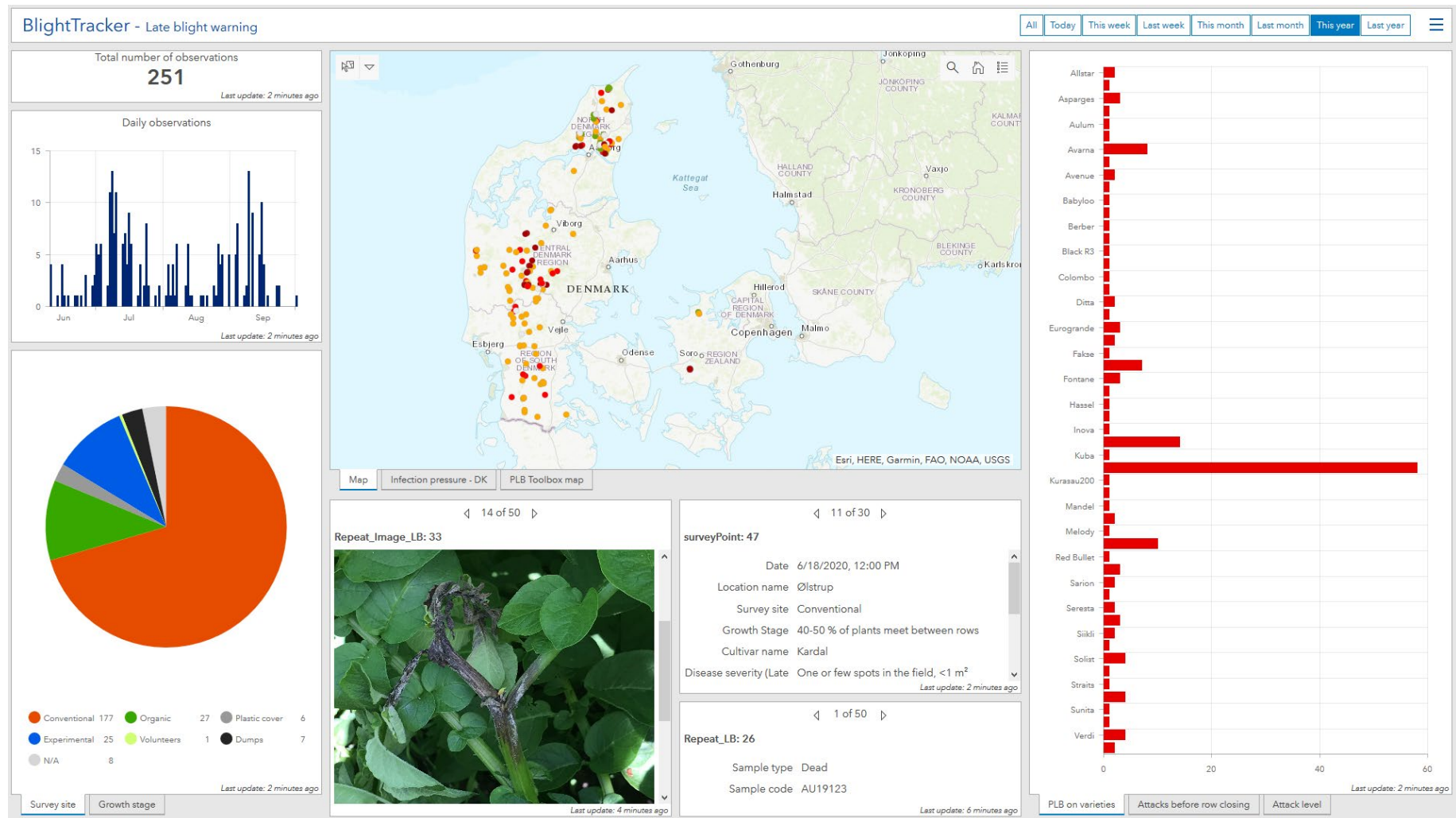
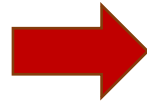
Survey site*: Organic

Growth Stage*: 10 % of plants meet between rows

Cultivar name*: Solist

Late Blight

Early Blight



Danish BlightManager DSS

Simulation model for research

Operational version for field test

POTATO LATE BLIGHT TOOLBOX

Home Survey Samples Trials Models Fungicides DSS Tools Skimmelstyring Skimmelstyring for Sverige Partners Administration Welcome Jens Grønbech Hansen [logout](#)

Under construction, Login name: Jens Grønbech Hansen

COMBINED BLIGHT MODELS

Year: 2018 Scenario: Slagelse 2018 Save Save as Delete Help

Select weather data file: Weather_2018_4200_Slagelse_Normal_DK_New.csv

Start date: 15. maj Stop date: 20. sep Crop emergence: 25. maj

Model: 2 models selected

Late Blight control actions

Infection risk: [Bar chart showing risk levels from May to September]

Infection pressure: [Bar chart showing pressure levels from May to September]

Protection period: [Bar chart showing protection periods from May to September]

Early Blight control actions

P-day: [Bar chart showing P-day from May to September]

Tomcast: [Bar chart showing Tomcast from May to September]

Protection period: [Bar chart showing protection periods from May to September]

24. aug 25. aug 26. aug 27. aug 28. aug 29. aug 30. aug 31. aug 1. sep 2. sep 3. sep 4. sep 5. sep 6. sep 7. sep 8. sep 9. sep 10. sep 11. sep 12. sep 13. sep 14. sep 15. sep 16. sep 17. sep 18. sep 19. sep 20. sep

Summary and statistics from simulations

Late Blight: Number of treatments: 3 Treatment frequency index: 2,00
Early Blight: Number of treatments: 6 Treatment frequency index: 5,00

Late Blight Protection period
Weather 2018 4200 Slagelse Normal DK.csv

Late Blight Infection Pressure
Weather 2018 4200 Slagelse Normal DK.csv

Result file

Protection period settings

Max day protection: 7

Threshold inf. risk: 93,0 Threshold inf. pres.: 10,0

Start phase 2: 27. jul Start phase 3: 10. aug Start phase 4: 30. aug

Dose: Phase 1 Phase 2 Phase 3 Phase 4

Inf. pres. > 60: 0 0 50 100
Inf. pres. 41-60: 0 0 50 100
Inf. pres. 21-40: 0 0 50 100
Inf. pres. 1-20: 0 0 0 0
Inf. pres. 0: 0 0 0 0

Dose model: Model B - 2020 Get dose model

Late Blight infection risk settings

Min. temp.: 5 Max. temp.: 28 Opt. temp.: 15
Wet. min. temp.: 6 Wet. max. temp.: 12
Threshold RH: 88,0 Threshold value: 93,0

Late Blight infection pressure settings

Parameter for humid hour: Relative humidity 88,0
 Leaf wetness
 Precipitation

Show

POTATO LATE BLIGHT TOOLBOX

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TRIAL APPLICATION INPUT

Trial site: Arnborg

Trial: Late Blight_Avarna, Arnborg

Treatment: All treatments selected

Weather data: Brande

Late Blight Infection Risk

Late Blight Infection Pressure

Phase: [Bar chart showing phase from May to September]

2. Routine, Last application: Date: 8. juli 2020, Fungicide: Ranman Top, Dosage: Full

3. Skimstyr fast int, Last application: Date: 8. juli 2020, Fungicide: Ranman Top, Dosage: Half

4. BM dyn int, Last application: Date: 2. juli 2020, Fungicide: Ranman Top, Dosage: Full

5. BM fuld dosis, Last application: Date: 2. juli 2020, Fungicide: Ranman Top, Dosage: Full

Start phase 2: 12. jun

Start phase 3: 12. jun

Start phase 4: 19. aug

Model charts

Weather data:

Report

Treatment	Date	Product	Dose
2. Routine	08.07	Ranman Top	Full
2. Routine	01.07	Ranman Top	Full
2. Routine	24.06	Ranman Top	Full
2. Routine	18.06	Ranman Top	Full
2. Routine	11.06	Ranman Top	Full
3. Skimstyr fz	08.07	Ranman Top	Half
3. Skimstyr fz	01.07	Ranman Top	Half
3. Skimstyr fz	24.06	Ranman Top	Half
3. Skimstyr fz	18.06	Ranman Top	Half
3. Skimstyr fz	11.06	Ranman Top	Half
4. BM dyn int	02.07	Ranman Top	Full
4. BM dyn int	27.06	Ranman Top	3/4
4. BM dyn int	19.06	Ranman Top	Half
4. BM dyn int	12.06	Ranman Top	Half
5. BM fuld dc	02.07	Ranman Top	Full
5. BM fuld dc	27.06	Ranman Top	Full
5. BM fuld dc	19.06	Ranman Top	Full
5. BM fuld dc	12.06	Ranman Top	Full

N = 18

New application

POTATO LATE BLIGHT TOOLBOX

COMBINED BLIGHT MODELS

Year: 2006 Scenario: Default Save Save as Delete Help

Select weather data file: Weather_2006_TEST.csv

Start date: 1. maj Stop date: 30. sep Crop emergence: 1. jun

Model: 3 models selected

Late Blight / Early Blight

Protection period settings

Max day protection: 7

Threshold inf. risk: 93,0 Threshold inf. pres.: 10,0

Start phase 2: 1. jun Start phase 3: 1. jul Start phase 4: 1. aug

Dose	Phase 1	Phase 2	Phase 3	Phase 4
Inf. pres. > 60	50	75	100	100
Inf. pres. 41-60	50	50	100	100
Inf. pres. 21-40	0	50	75	100
Inf. pres. 1-20	0	50	50	75
Inf. pres. 0	0	0	50	50

Dose model: Empty2019 Get dose model

Late Blight infection risk settings

Min. temp.: 5 Max. temp.: 28 Opt. temp.: 15

Wet. min. temp.: 6 Wet. max. temp.: 12

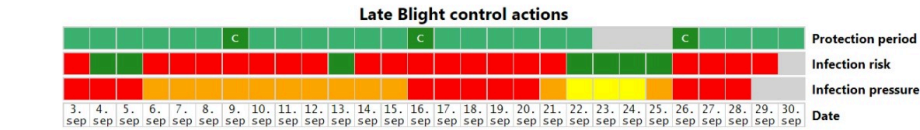
Threshold RH: 88,0 Threshold value: 93,0

Late Blight infection pressure settings

Parameter for humid hour: Relative humidity Leaf wetness Precipitation

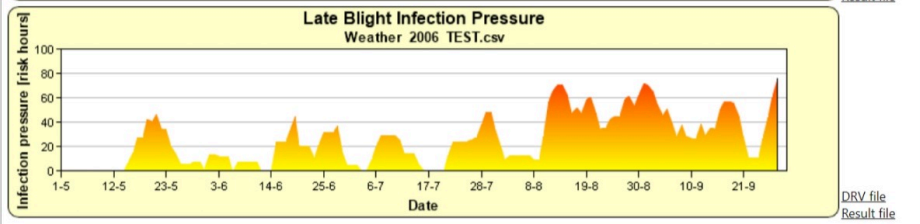
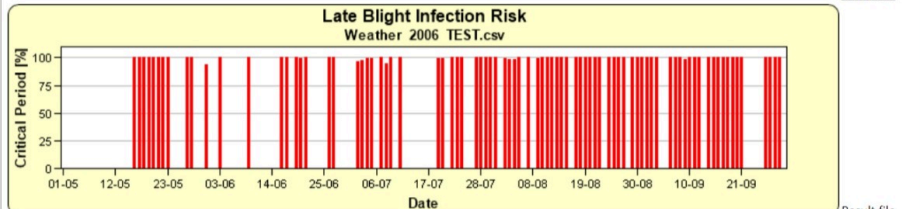
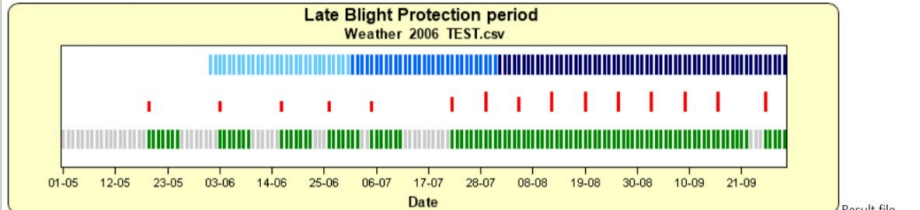
Threshold RH: 88,0

Show

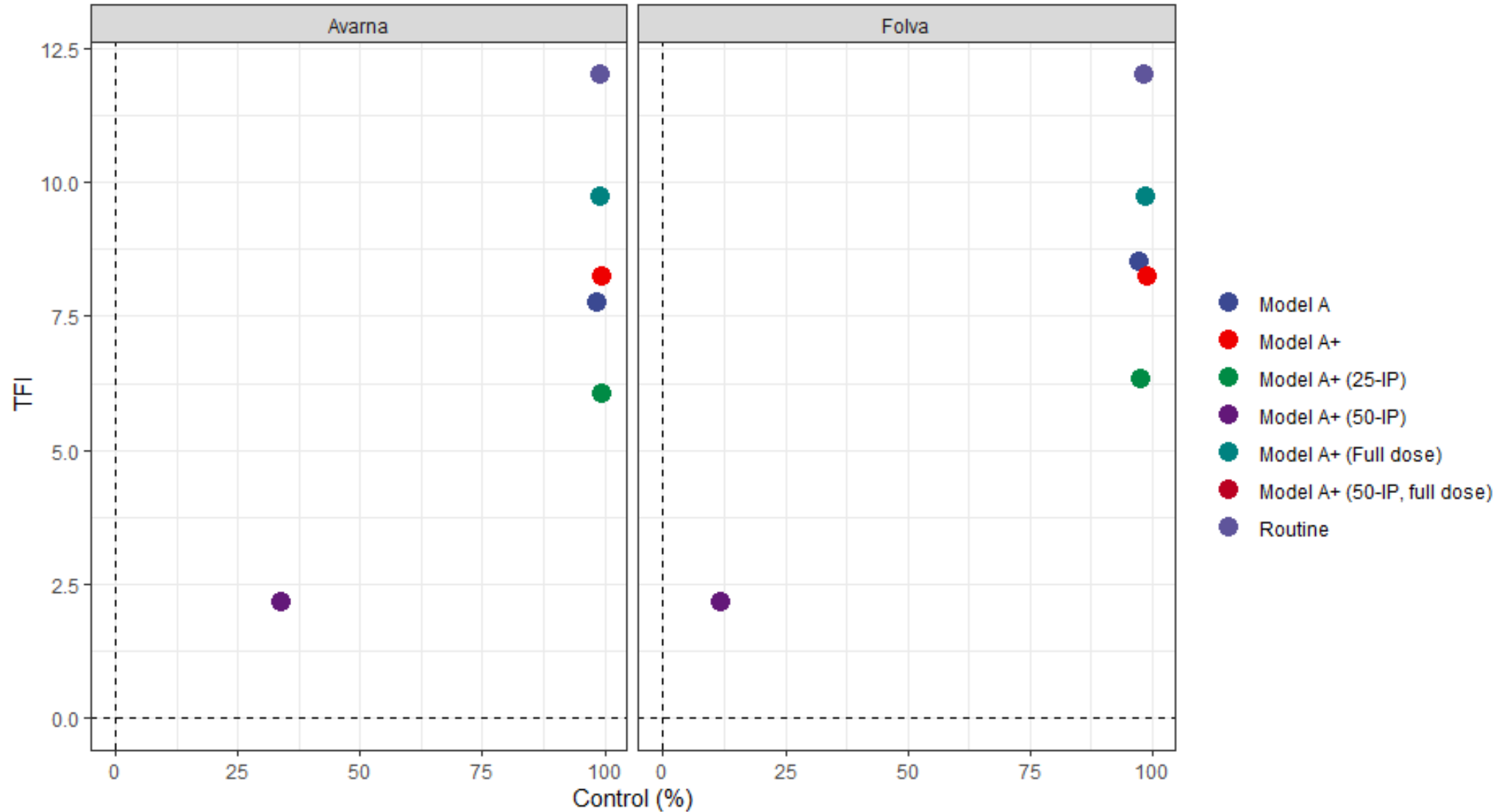


Summary and statistics from simulations

Late Blight: Number of treatments: 15 Treatment frequency index: 12,00
 Early Blight: Number of treatments: 5 Treatment frequency index: 4,00



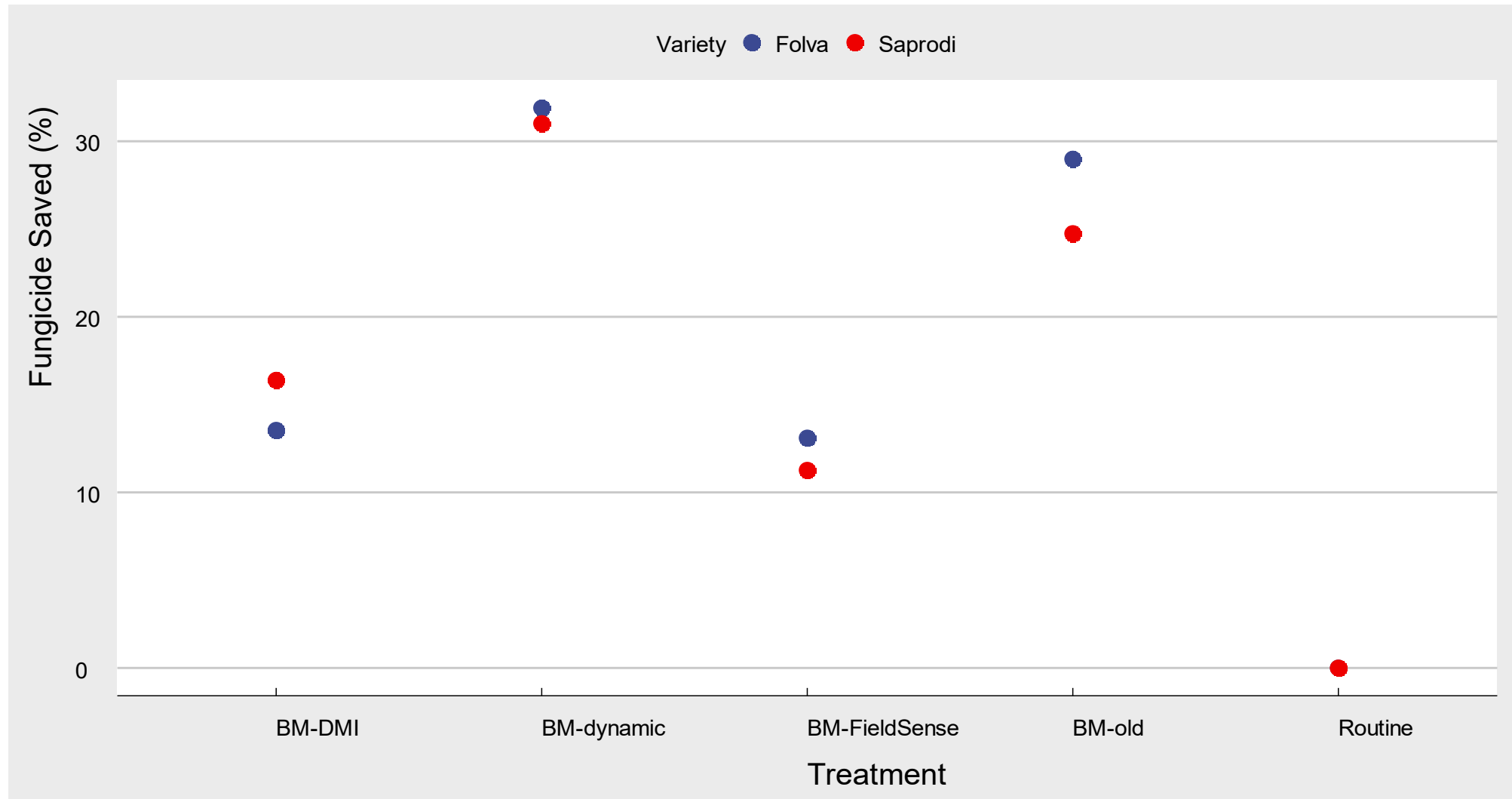
Validation of sub-models in 2019-2020



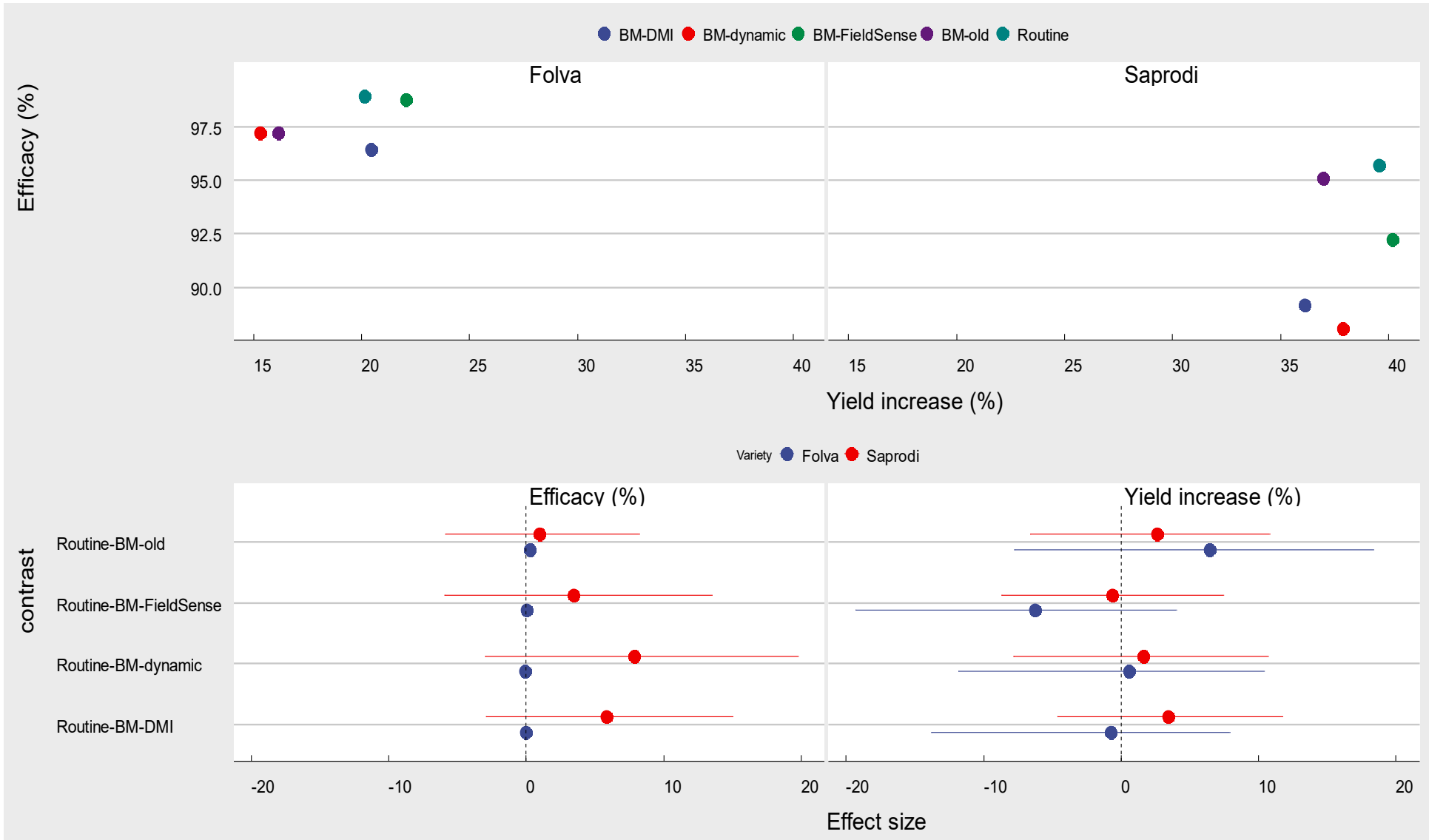
Field trials in 2021

- Untreated. No use of fungicides for late blight control.
- Routine: Weekly application of Ranman Top (0.5 l/ha)
- Skimmelstyring (BM-old)
- BlightManager model with variable spraying interval and variable dosage (BM-dynamic).
- BlightManager model with fixed dosage (full dosage) but variable application intervals
 - With national DSS (BM-DMI) or
 - With in-field station (BM-FS)

Fungicide saved



Efficacy and yield increase

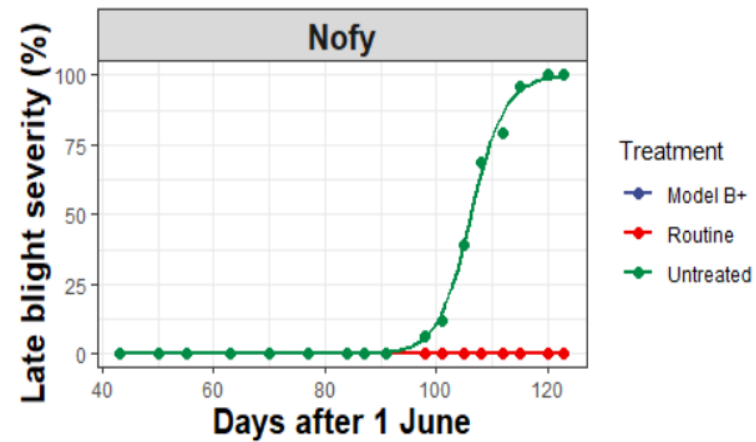
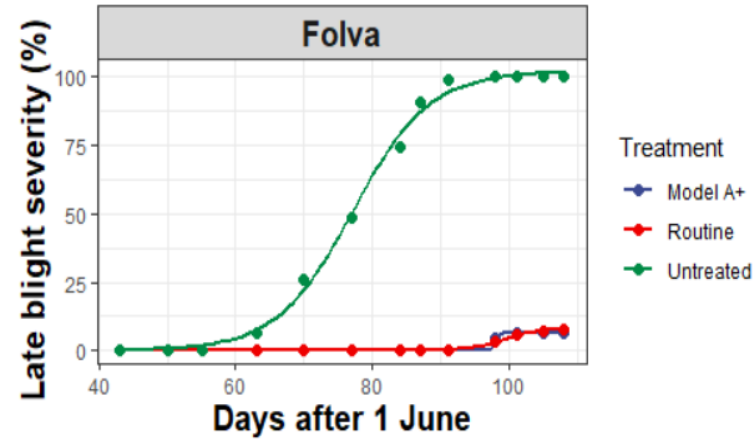


Summary of 12 trials (2020-2021) to validate the DSS

		Dosage	Interval	Late blight %.			TFI	Rel.	Cost p.ha	Starch%	Udb. og merudb.		
				Flakkebjerg	Arnborg	Dronninglund					hkg Tubers pr. ha	hkg starch pr. ha	Net income ²⁾ , kr. pr. ha
<i>2020-2021. 6 forsøg, startch</i>													
1.	Untreated	-	-	100	94	59	0,0		0	19,7	-147	-39	-9.692
2.	Rutine, full dosis	Full	Fixed	0,1	28	1	12,9	100	3.479	21,6	537	115	35.611
3.	BM-old	Variabel	Fixed	0,1	31	3	9,8	76	2.854	21,8	-9	0	513
4.	BM.dynamic	Variabel	Variable	0,0	50	3	9,5	73	2.611	21,8	-9	-1	518
5.	BM-DMI	Full	Variable	0,0	39	3	11,4	88	2.992	21,8	-6	0	419
<i>LSD</i>										<i>0,6</i>	<i>46</i>	<i>11</i>	
<i>2020-2021. 6 trials, ware potato</i>													
1.	Untreated	-	-	100	78	100	0,0		0	-	-113	-	-
2.	Rutine, full dosis	Full	Fixed	0,1	1	3	9,8	100	2.601	-	582	-	-
3.	BM-old	Variabel	Fixed	0,3	4	4	7,0	71	2.056	-	-8	-	-
4.	BM.dynamic	Variabel	Variable	0,1	6	8	7,0	71	1.905	-	-10	-	-
5.	BM-DMI	Full	Variable	0,0	7	6	8,4	86	2.218	-	-4	-	-
<i>LSD</i>										<i>23</i>			
¹⁾ Se nærmere beskrivelse af forsøgsbehandlingerne i teksten.													
²⁾ Nettoudbyttet i stivelseskartofler er beregnet på baggrund af en antaget pris på stivelse på 3,4 kr. pr. kg inkl. efterbetaling.													

Disease development and fungicide saved

a



b

