

Kartoffelbladplet: modeller, bekæmpelse og fungicidresistens. Hvad er perspektiverne?

Isaac K. Abuley

ikabuley@agro.au.dk

BlightManager

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Kartoffelafgiftsfonden

Kartoffelbladplet og forvekslingsmuligheder



Cercospora



Brunspot



Brunspot



Fysiologisk (hypersentiv) plet



kartoffelbladplet?



kartoffelbladplet?



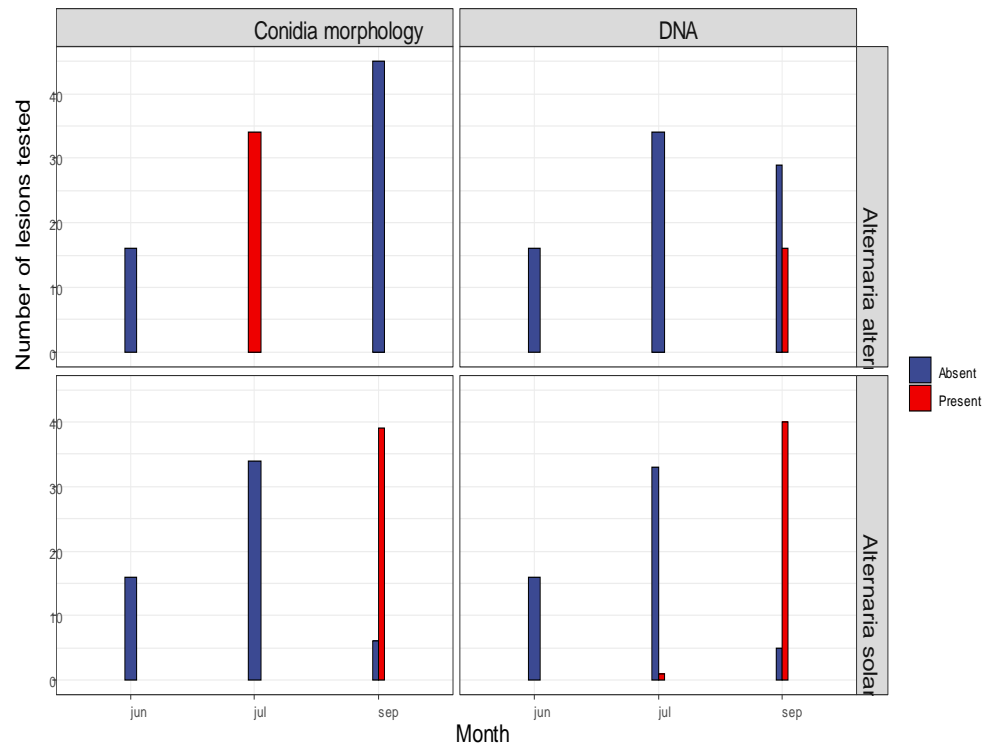
kartoffelbladplet



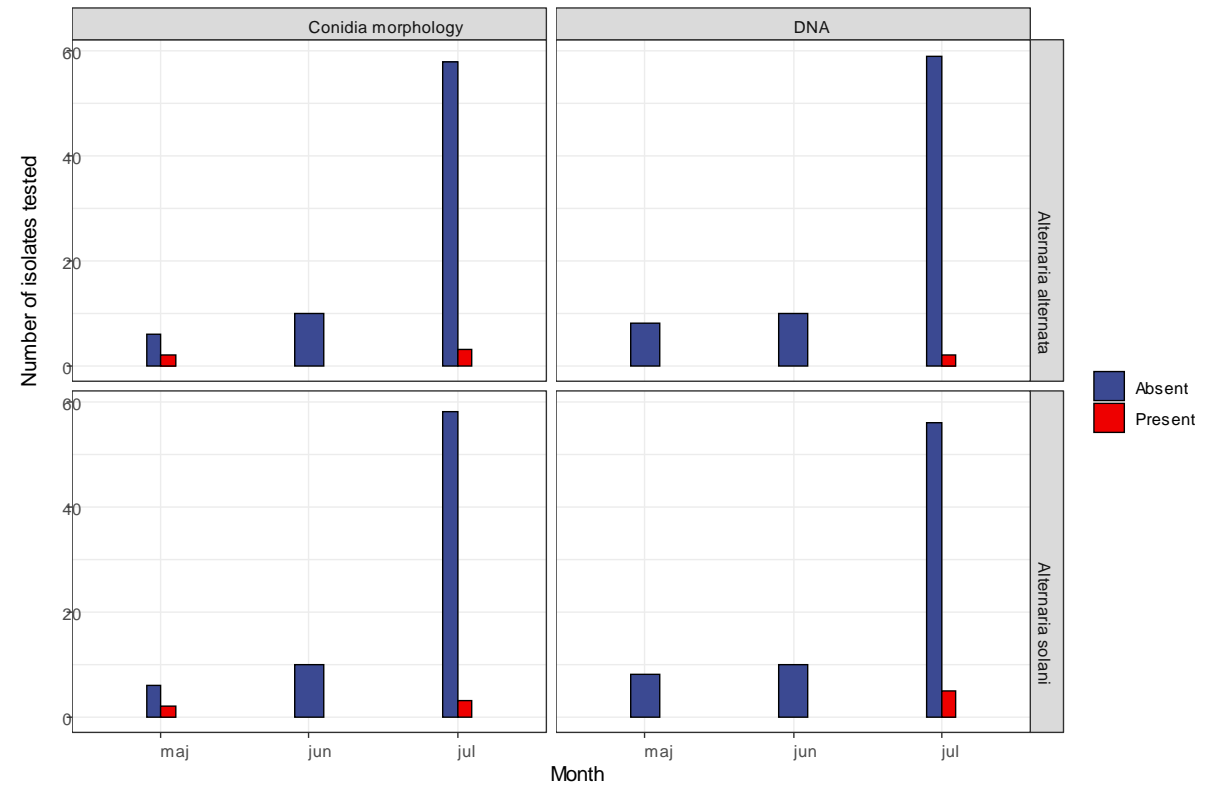
kartoffelbladplet

Identifikation af kartoffelblet er stadig svært

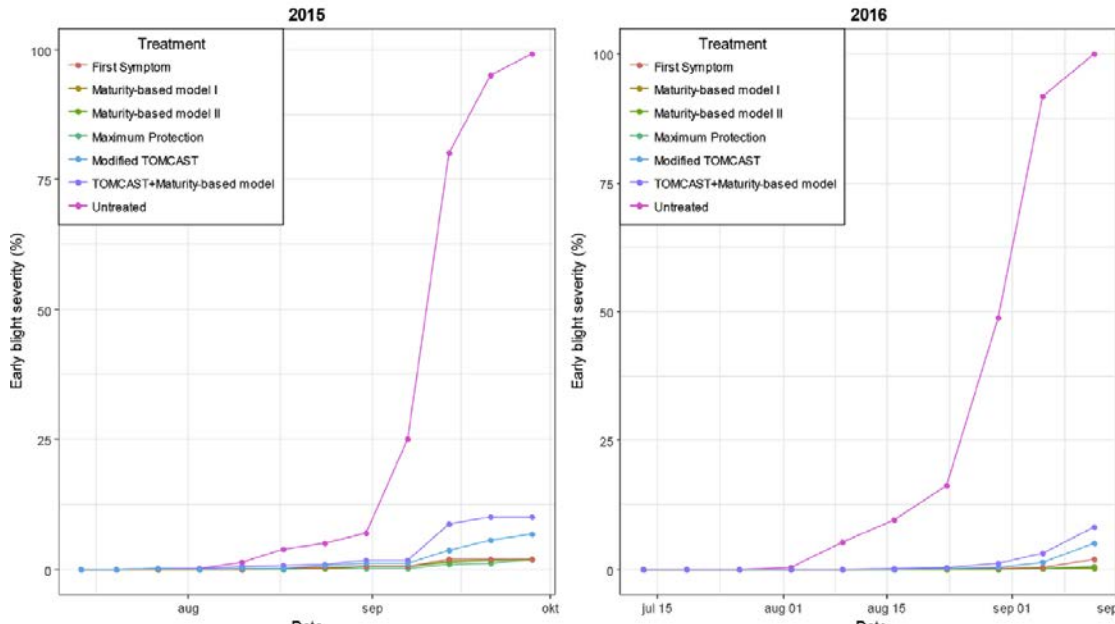
2019



2020



Modeler: Hvordan starter vi?



cv. Kardal

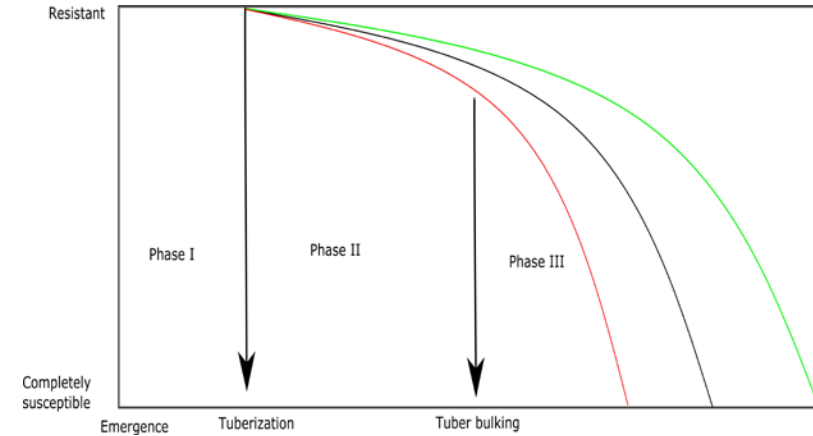
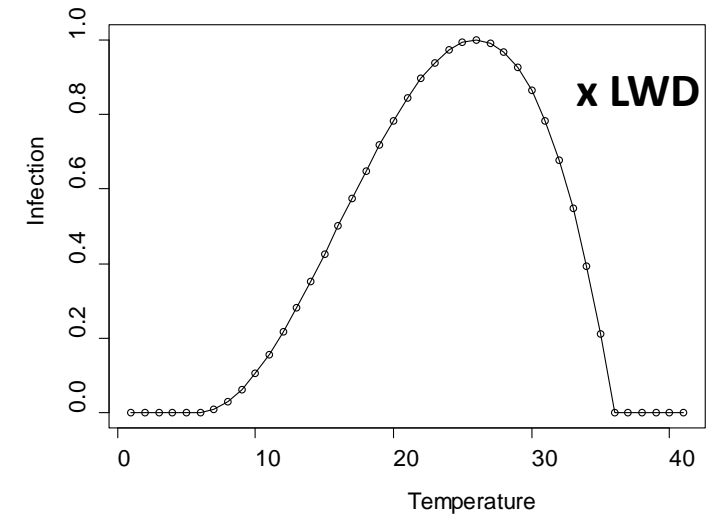
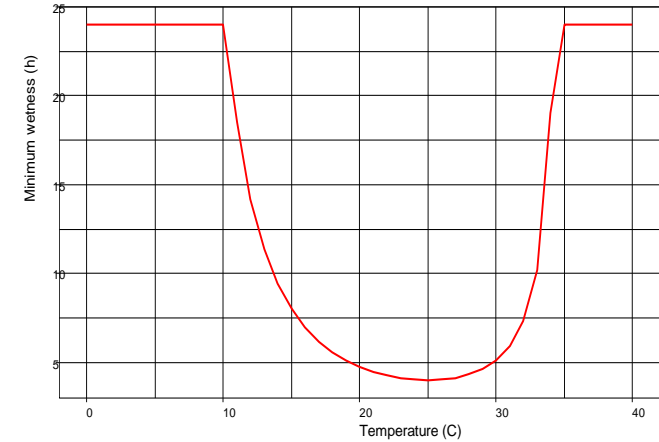
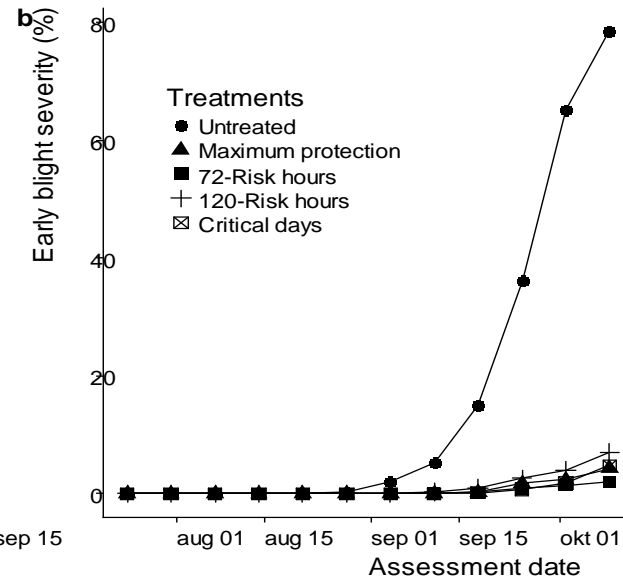
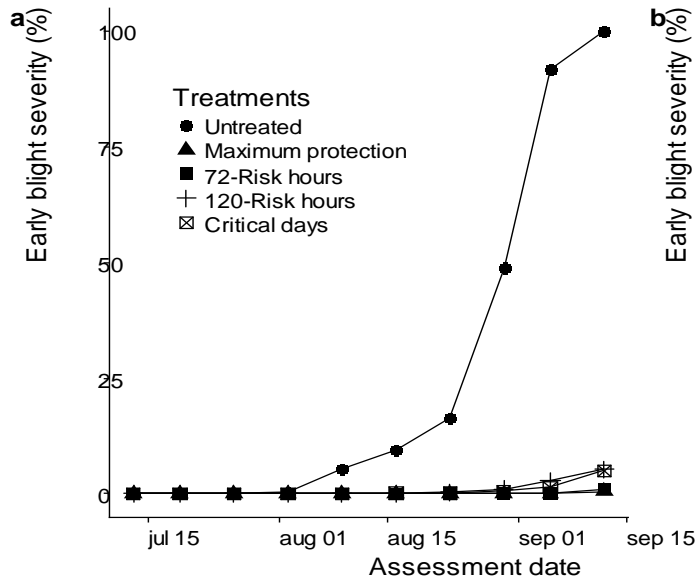


Table 1: DSV chart of FAST (and TOMCAST)

Average temperatures (°C) during leaf wet hours	Leaf Wetness per Day(h)				
13-17	0-6	7-15	16-20	21+	21+
18-20	0-3	4-8	9-15	16-22	23+
21-25	0-2	3-5	6-12	13-20	21+
26-29	0-3	4-8	9-15	16-22	23+
DSV=	0	1	2	3	4

Source: Madden et al. (1978)

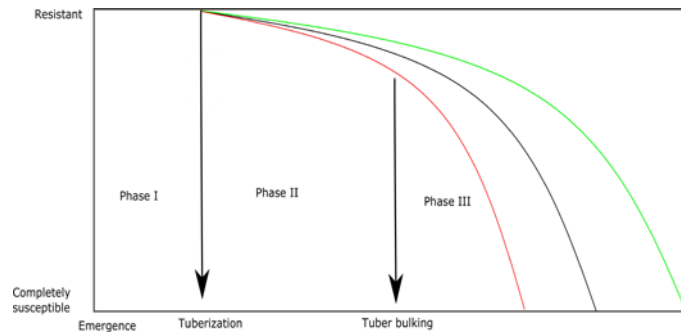
Kritiske og Risiko timer model (cv. Kuras) med Signum WG



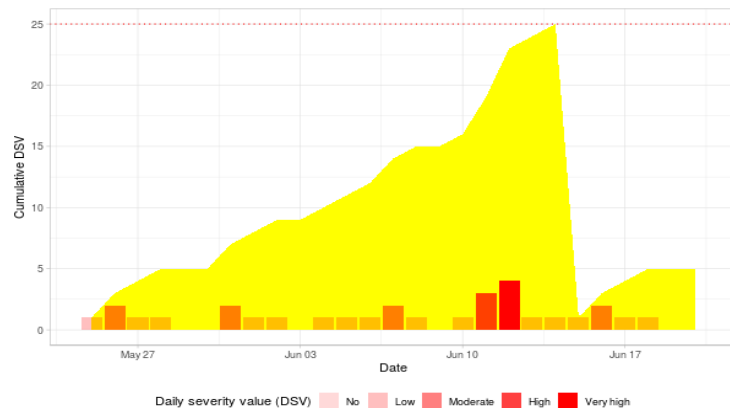
Critical days = Kritiske model
Risk hours = risiko timer model

Vores model system er næsten klar!!

Model baseret på fysiologisk alder



Vejr baseret varsling



POTATO LATE BLIGHT TOOLBOX

Home Survey Samples Trials Models Fungicides DSS Tools Skimmelstyring Partners Welcome Isaac Abuley [logout](#)

TRIAL APPLICATION INPUT

Trial site:

Trial:

Treatment:

Weather data:

50% crop emergence:

Model charts:

Weather data:

Early Blight Tomcast:

Routine, Last application: Date: 10. september 2020, Fungicide: Narita, Dosage: Full

TOMCAST, Last application: Date: 8. oktober 2020, Fungicide: Narita, Dosage: Full

TOMCAST full dose, Last application: Date: 16. september 2020, Fungicide: Narita, Dosage: Full

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 01 02 03 04 05 06 07 08 09

Early Blight physiological days Brande

Result: 400, 200, 0

Date: 12-11, 14-11, 16-11, 18-11, 20-11, 22-11, 24-11, 26-11, 28-11, 30-11, 02-12, 04-12, 06-12, 08-12

Early Blight Tomcast Brande

Result: 30, 20, 10, 0

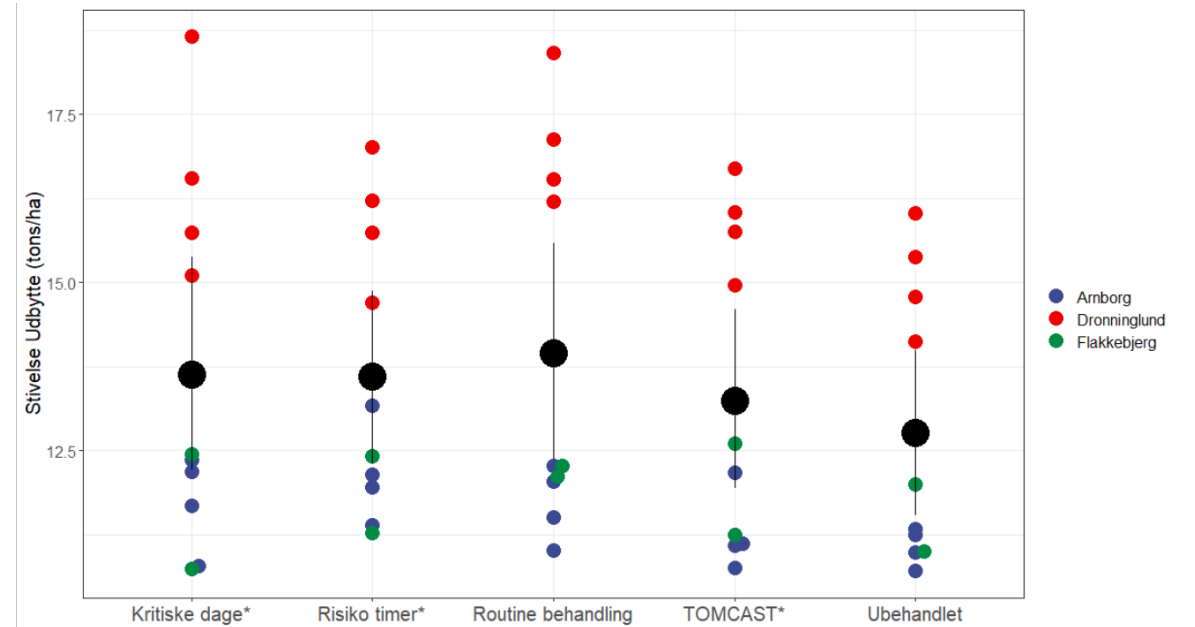
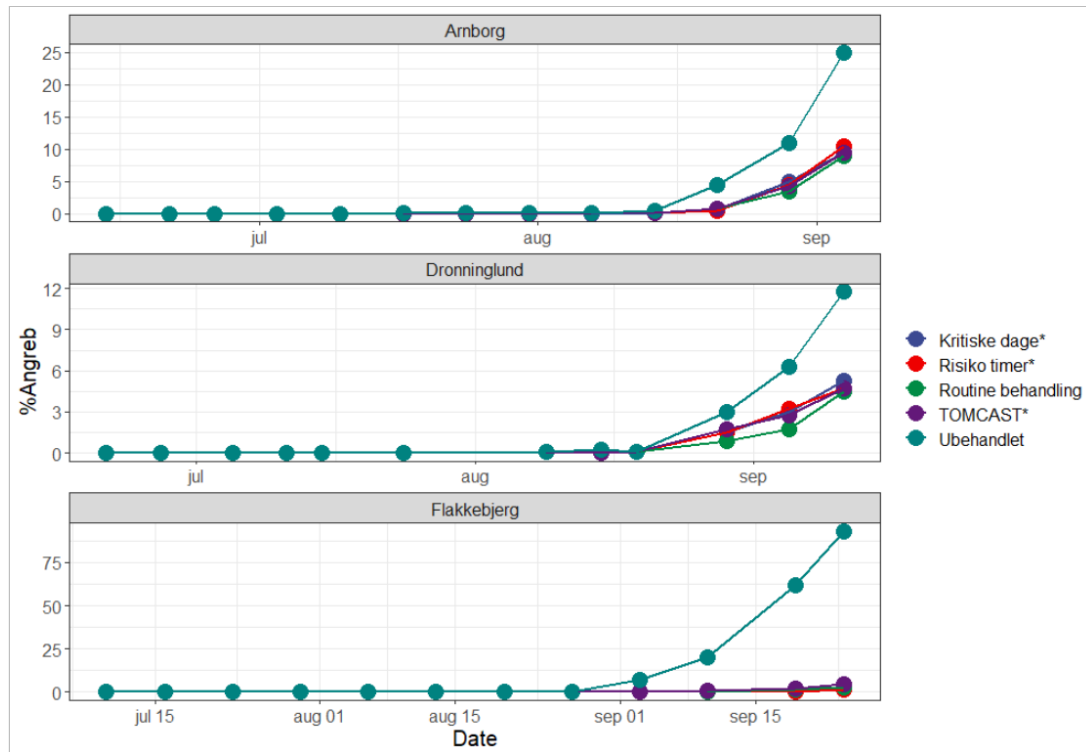
Date: 12-11, 14-11, 16-11, 18-11, 20-11, 22-11, 24-11, 26-11, 28-11, 30-11, 02-12, 04-12, 06-12, 08-12

Treatment	Date	Product	Dose
Routine	10.09	Narita	Full
Routine	28.08	Narita	Full
Routine	14.08	Narita	Full
Routine	31.07	Narita	Full
Routine	17.07	Narita	Full
Routine	03.07	Narita	Full
TOMCAST	08.10	Narita	Full
TOMCAST	16.09	Narita	Full
TOMCAST	02.09	Narita	Full
TOMCAST	19.08	Narita	Full
TOMCAST	03.08	Narita	Half
TOMCAST	17.07	Narita	Half
TOMCAST fu	16.09	Narita	Full
TOMCAST fu	02.09	Narita	Full
TOMCAST fu	19.08	Narita	Full
TOMCAST fu	03.08	Narita	Full
TOMCAST fu	17.07	Narita	Full

N = 17

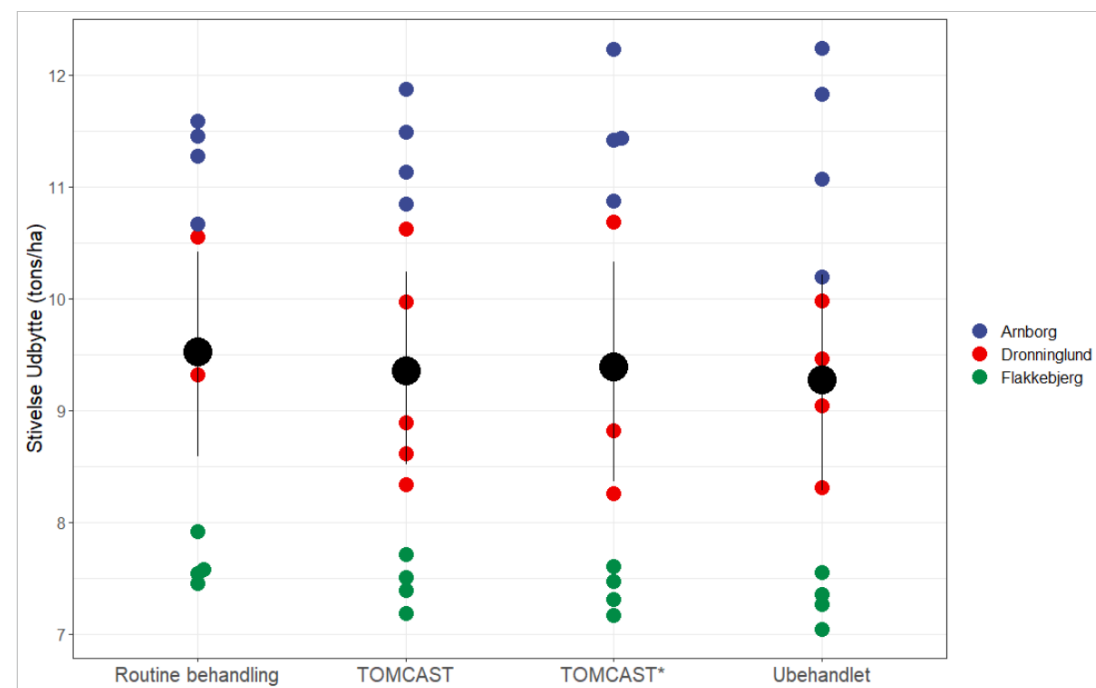
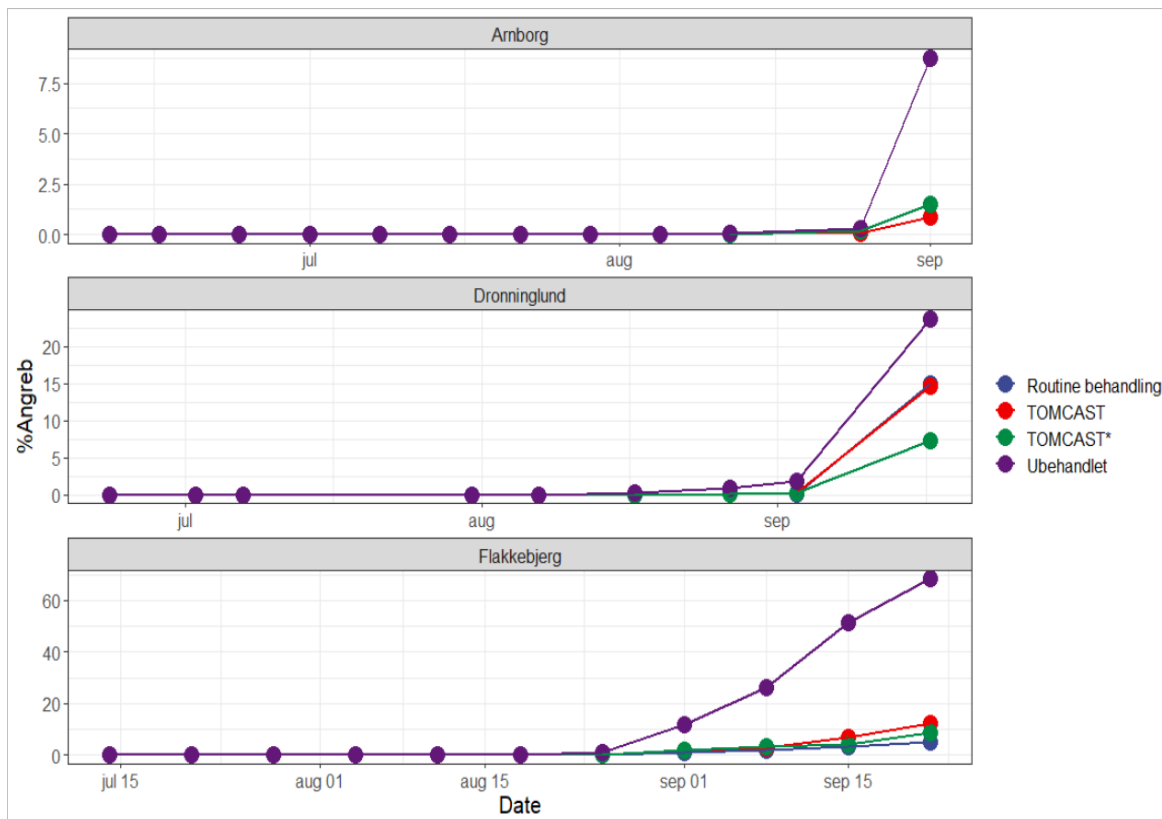
Web site provided by [Aarhus University, Faculty of Technical Sciences, Department of Agroecology](#).
Report technical problems to webmaster: [Poul Lassen](#). Optimized for screen size 1280x800.
Version 2.2. Build: 7637. Release date: 28. november 2020.

Test af modeller i 2019 (cv. Avarna) med Signum WG



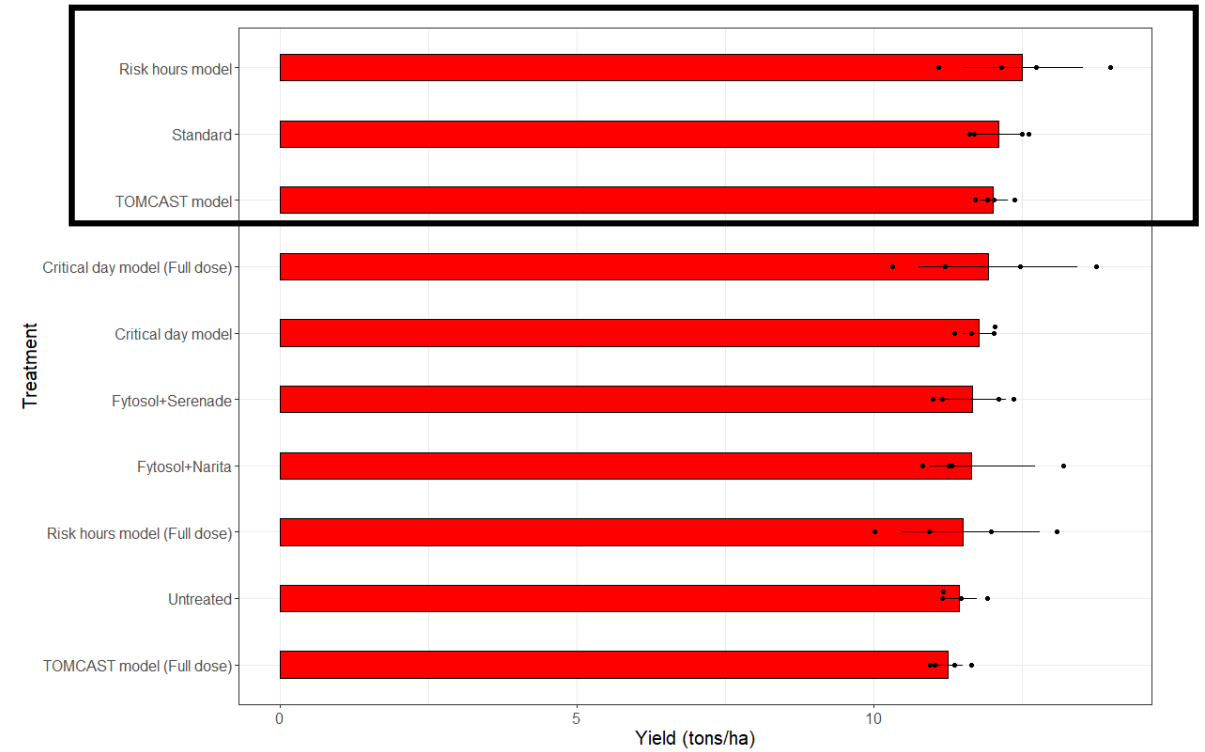
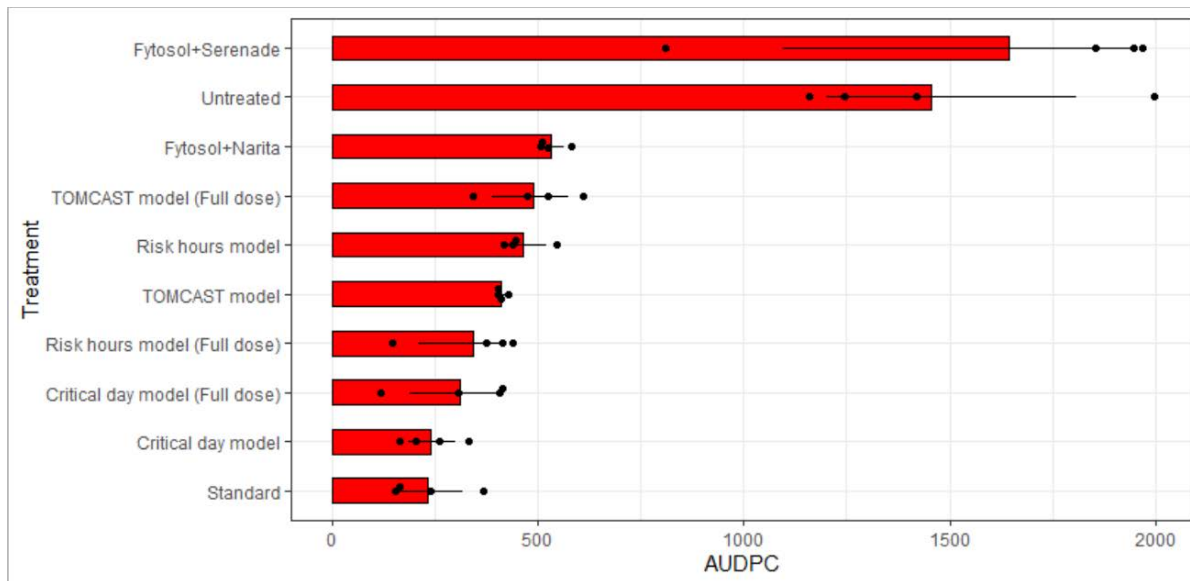
* variabel dosering

Test af modeller i 2020 (cv. Avarna) med Narita

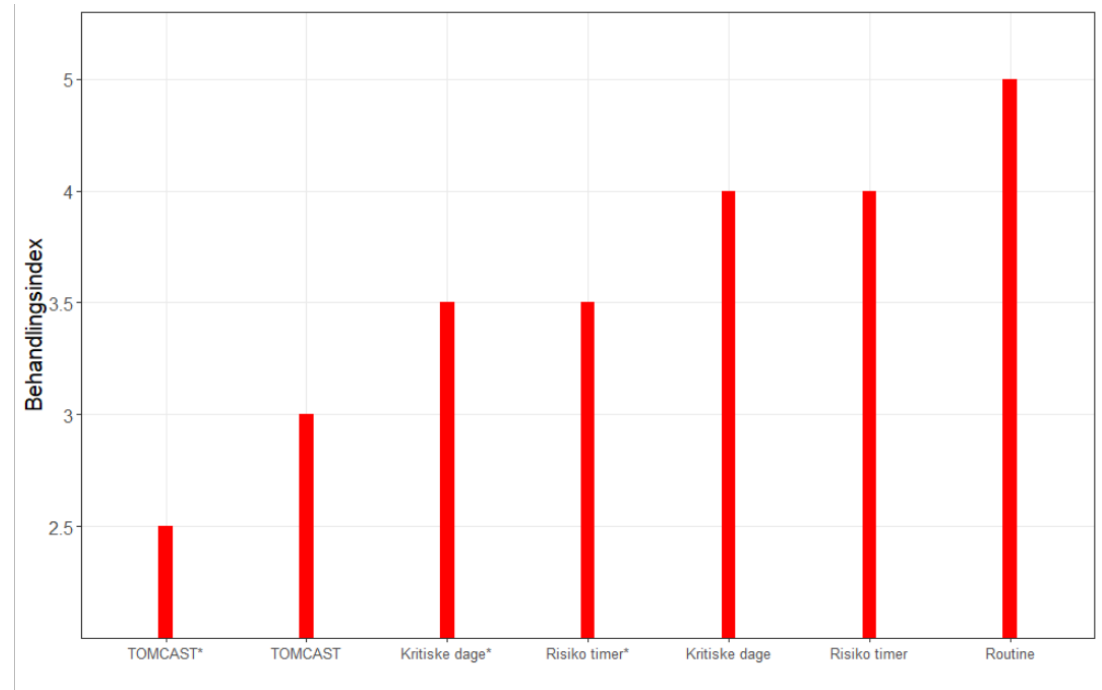
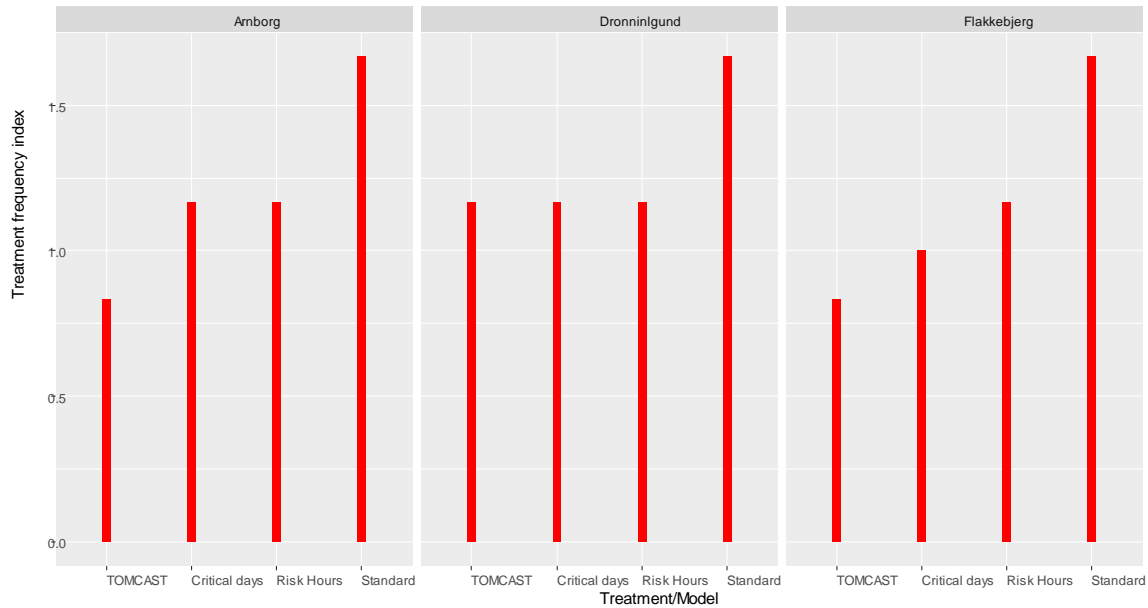


* variabel dosering

Test af modeller i 2020 (cv. Avarna) med Narita

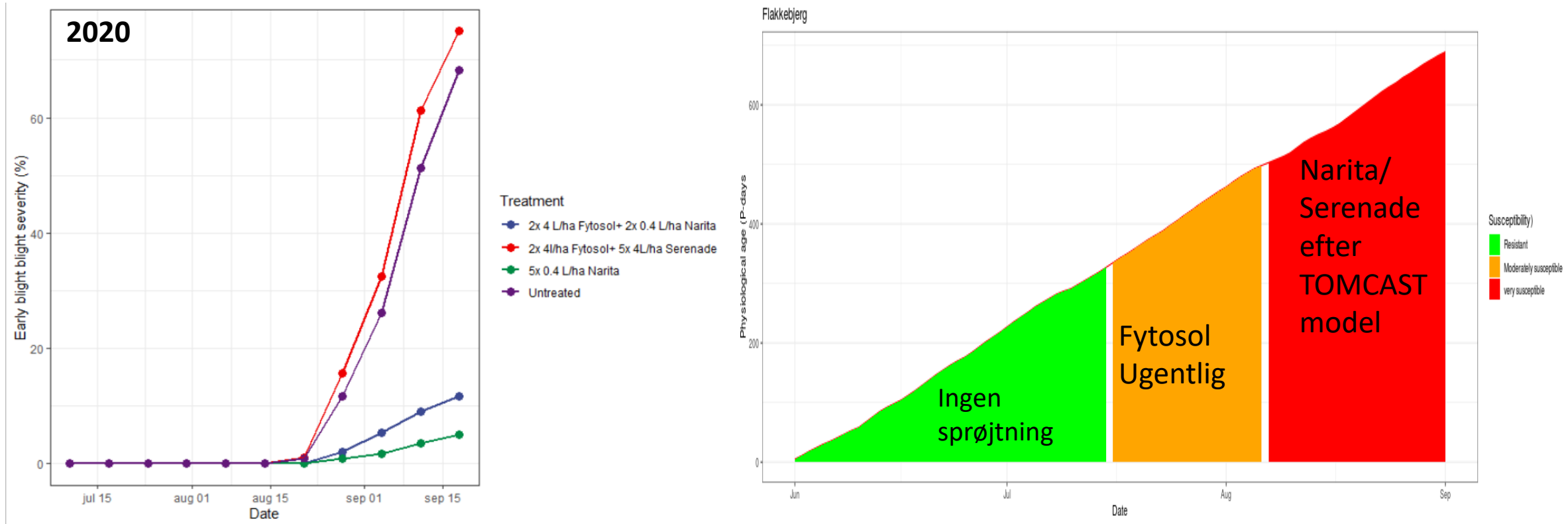


Model med beregning af risikotimer er bedre, men den anbefaler for mange fungicid behandlinger ift. TOMCAST



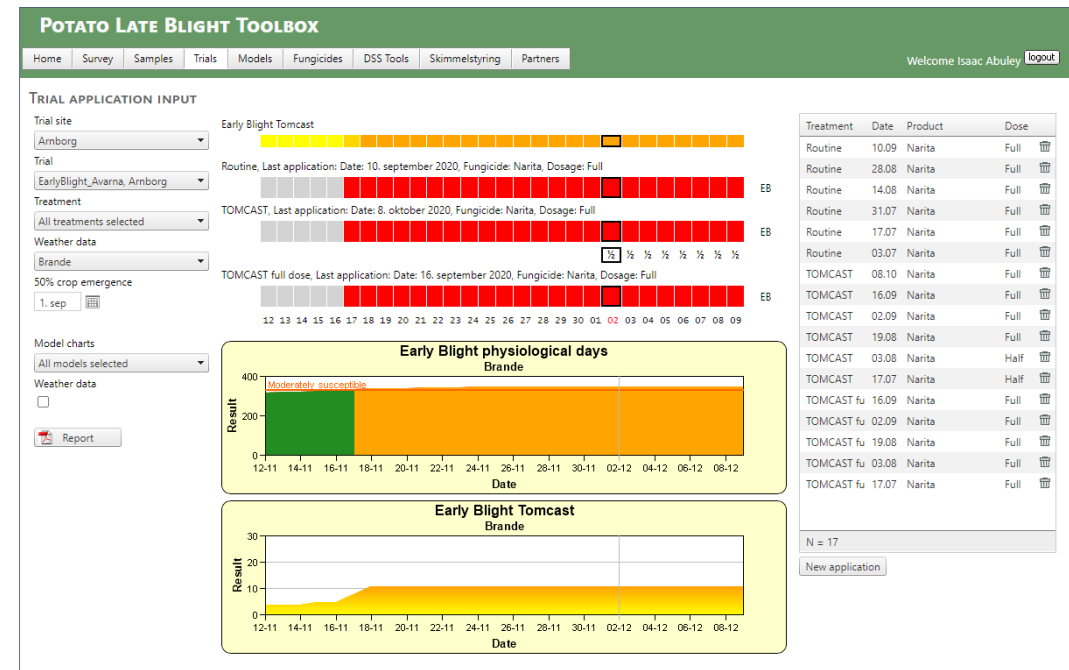
* variabel dosering

Kan vi bruge modellerne med alternative middel?



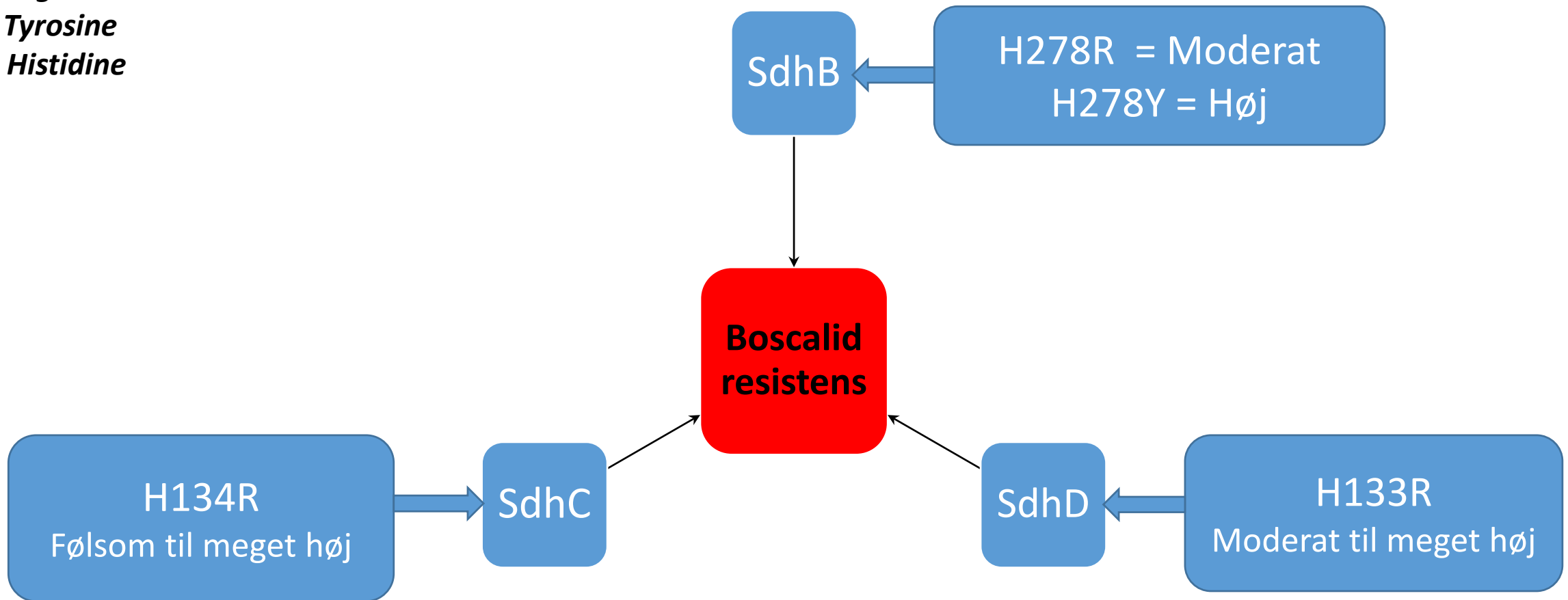
Konklusioner

- TOMCAST giver god bekæmpelse af kartoffelbladplet.
- Men, vi vil bruge TOMCAST sammen med beregning af risiko timer for at gøre anbefaling om bekæmpelse mere sikker.



Boscalid resistens i Alternaria

R = Arginine
Y = Tyrosine
H = Histidine

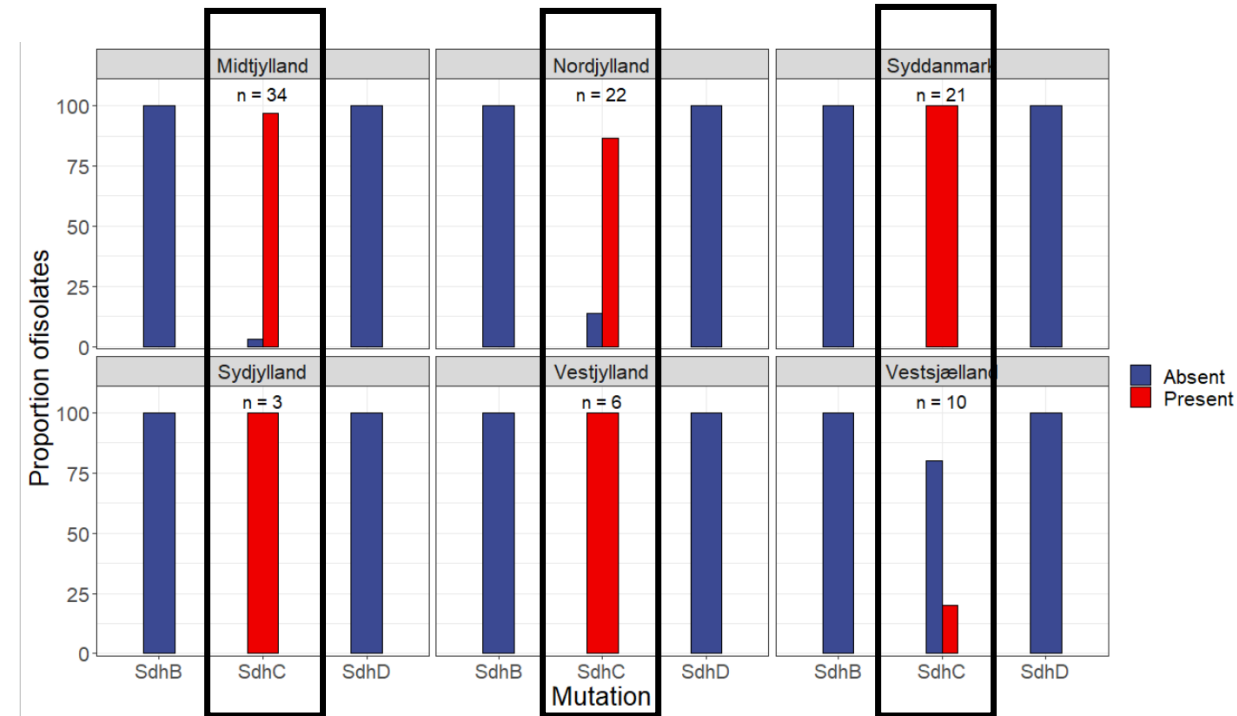


Oversigt af SDHI resistance i Danmark

2016

2020

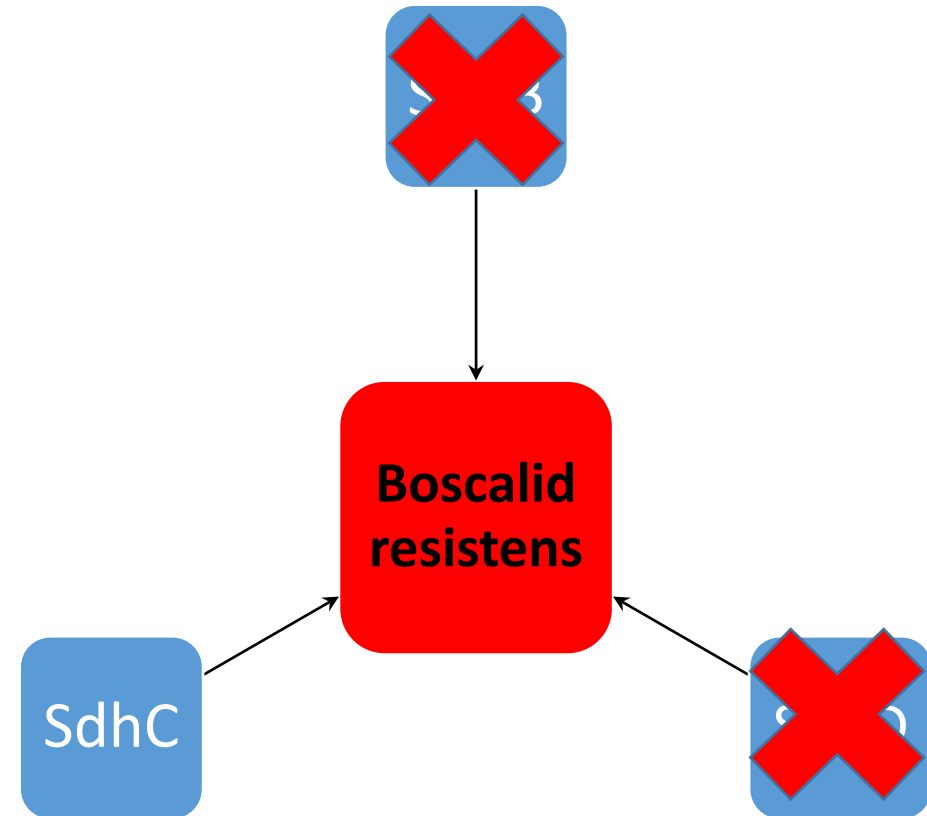
Isolate	Location	Qol	SdhB (H278R or H278Y)*	SdhC (H134R)	SdhD (H133R)
360	Flakkebjerg	Wildtype	H	H	H
370	Billund	Wildtype	H	H	H
380	Billund	F129L	H	H	H
390	Billund	F129L	H	H	H
400	Skive	F129L	H	R	H
420	Grindsted	F129L	H	H	H
430	Billund	F129L	H	R	H
440	Billund	F129L	H	H	H
460	Billund	F129L	H	R	H
463	Sunds	F129L	H	R	H



Sammendrag om SDH resistens i Danmark

Baseret på nuværende data kan vi konkludere følgende:

- Mutationer i ShdB og SdhD er ikke registreret i Danmark
- De fleste testede isolater af *Alternaria solani* har SdhC mutationen.



Betydning af SdhC mutation i praksis

- SdhC mutationen i *Alternaria* giver mindre følsomhed overfor SDHI fungicider for nogle isolater, men ikke alle!
 - Derfor ved vi ikke endnu hvad det præcist betyder for bekæmpelse af kartoffel bladplet i praksis.
- Baseret på resultater fra USA (Malik et al. 2014) *Alternaria* med SdhC mutation betyder at:
 - Den kan bekæmpes med Fluopyram
 - Den er generelt mindre følsom overfor boscalid og Penthiopyrad .
- Vi vil gerne bestemme fænotypen af vores *Alternaria* isolater i fremtiden.
- Men vi skal også bruge anti-resistant strategier til forebyggelse og bekæmpelse af *Alternaria*

Isolate	Lokalitet	Boscalid	Fluopyram	Penthiopyrad
1179-14	North Dakota	Resistent	Følsom	Resistent
1179-13	North Dakota	Resistent	Følsom	Følsom
1174-9	Idaho	Følsom	Følsom	Resistent
1231-9	North Darkota	Moderat resistent	Følsom	Meget resistent
1239-20	North Darkota	Meget resistent	Følsom	Meget resistent

Fra Malik et al. (2014)