Timing the application of fungicides to control potato early blight (*Alternaria Solani*) In multi-location field trials In Denmark

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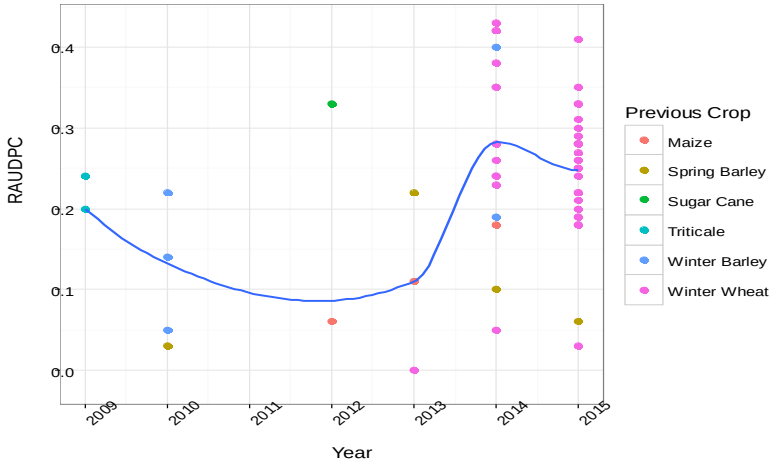
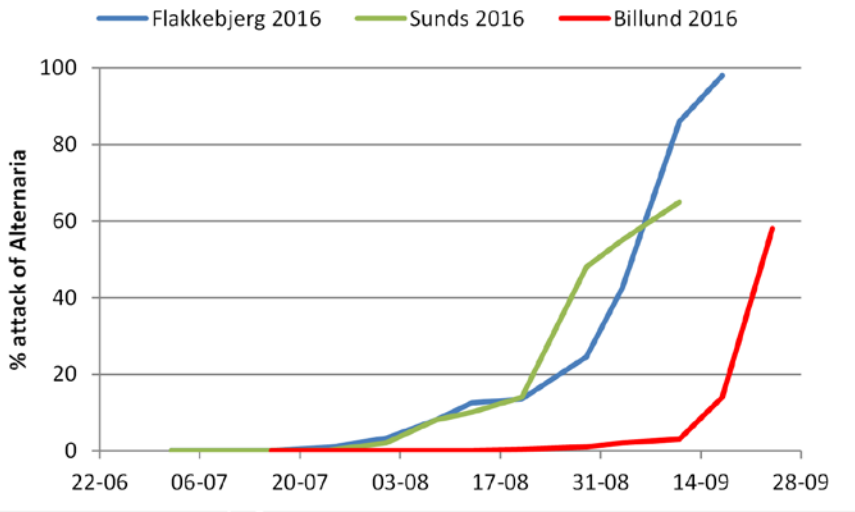
Content

- Overview of early blight in Denmark
- Objectives of the study
- Materials & Method
  - Model description
  - Treatments
  - Experimental design
- Results
- Conclusions

Overview of early blight in DK

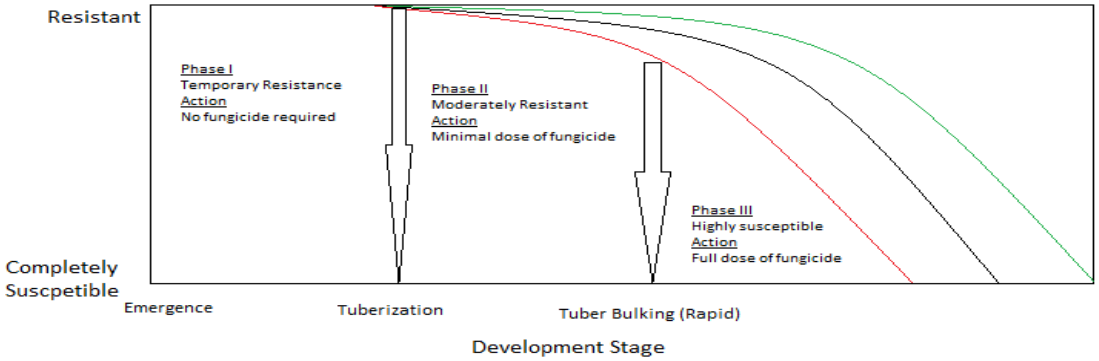




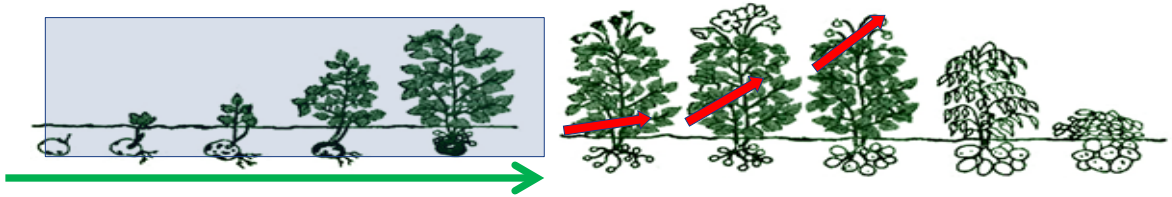
Objectives

- To evaluate different models to control early blight compared a standard practice in multi-location field trials in Denmark.
- Should the models perform well in all trial sites, we can recommend the models for use by farmers across Denmark.

Age-related susceptibility



Similar model in Shtienberg (2014)



300-330 Pdays

TOMCAST, DSV

- A weather-based model
- Calculates EB risk as daily severity values (DSV)
- DSV is a determined by the interaction between Duration of leaf wetness and Temperature

Average temp(°C) during LW hours	Leaf Wetness per Day(h)				
13-17	0-6	7-15	16-20	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

Madden et al., 1978

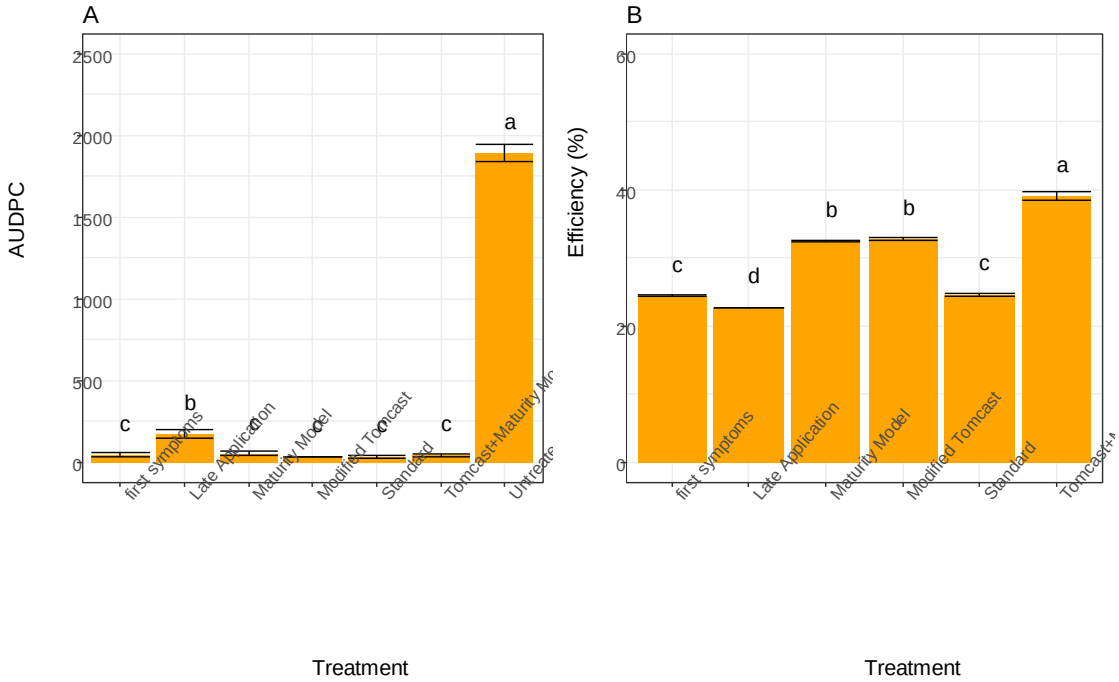
Treatments

Treatment	Fungicide application Schedule
Untreated	No fungicide application
Standard	4x 0.25kgha^{-1} Signum (full dose) from 7WAE, 14 days interval
First symptoms	4x 0.25kgha^{-1} Signum from 0.03-0.1% symptoms, 14 days interval
Late application	4x 0.25kgha^{-1} Signum 14 days after first symptoms, 14 days interval
Maturity-based Model I	330P-days: ½ of 0.25kgha^{-1}Signum @ 14 days interval, 500-Pdays: Full dose at 14 days interval
TOMCAST	330 P-days: 1st @ full dose Signum, Subsequent spray: 20 DSV @ full dose dose
TOMCAST+Maturity-Based Model	• 1st Spray: 330 P-days + 25 DSV since emergence. • 3/4th of 0.25kgha^{-1}Signum: DSV ≥ **25 + 330** ≥ Pdays <**500**, • 0.25kgha^{-1}Signum: DSV ≥ **25 +** Pdays >**500** • Subsequent application is based on accumulation of 20 DSV

Experimental plan

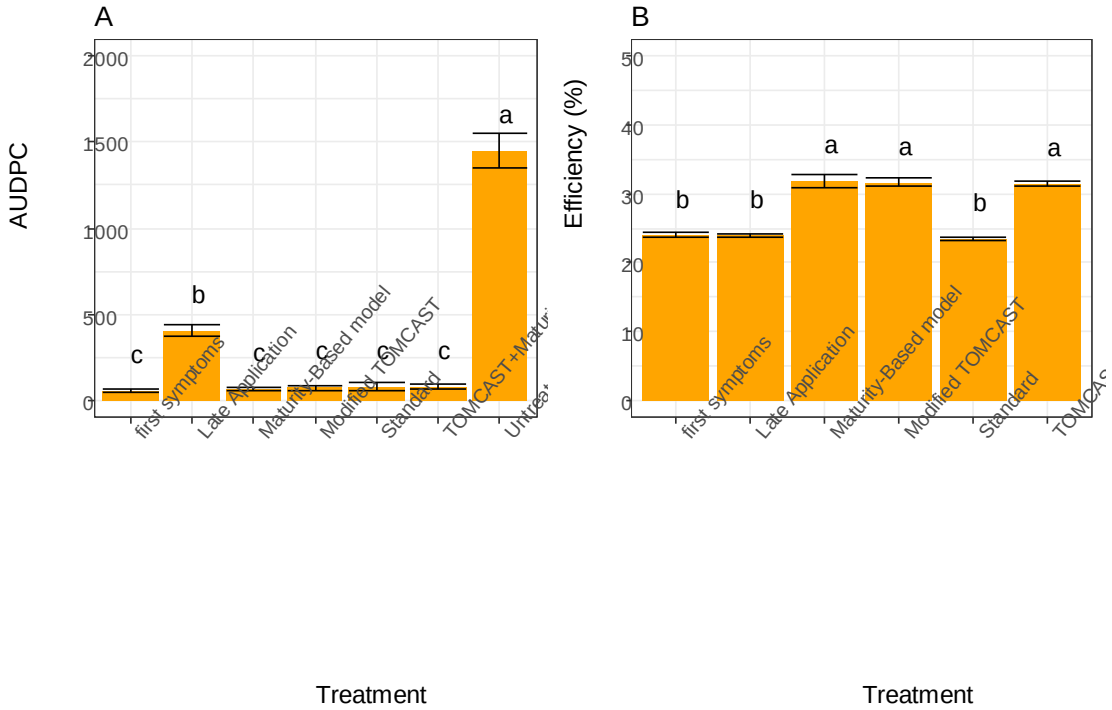
- 3 field experiments
  - Flakkebjerg (artificial inoculation with *A. solani* & *A. alternata)*
  - Sunds
  - Billund
  - Natural infection
  - Variety: Kuras
  - Design: RCBD
- Late blight control with 0.5lha^{-1} Ranman Top

Results-Flakkebjerg, 2016



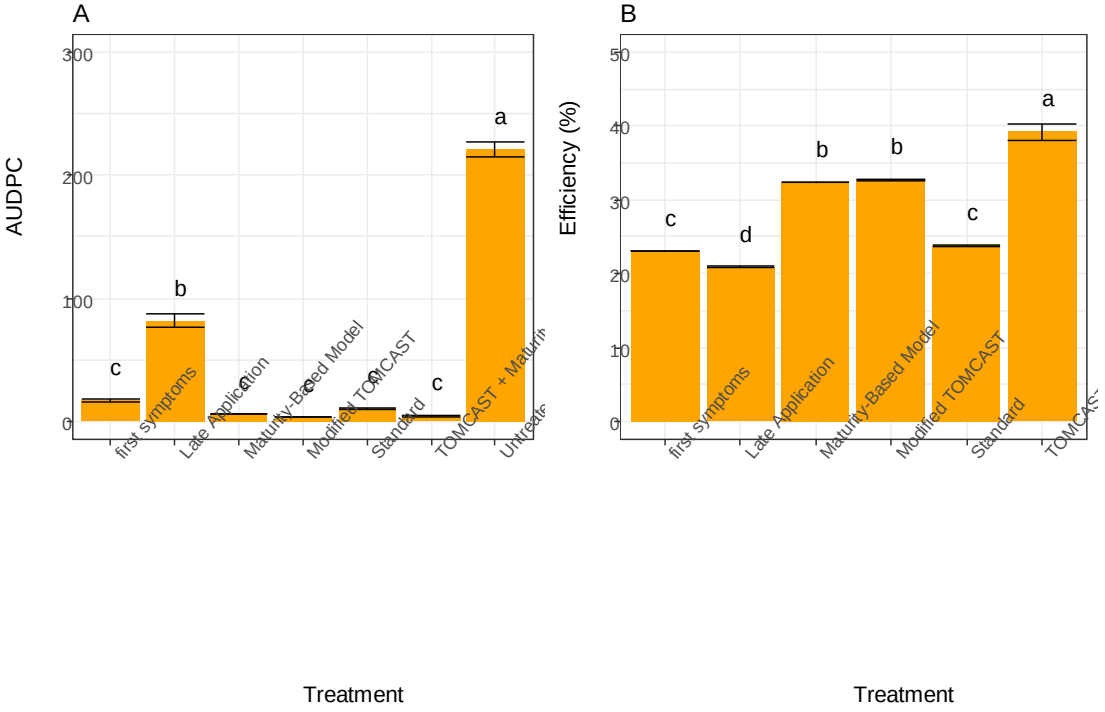
Date	Fungicide frequency index
Treatment	
Untreated	0
Standard	4
First symptoms	4
Late application	3
Maturity-based model	3
TOMCAST	3
TOMCAST+Maturity-based model	2.5

Results-Billund, 2016



Date	Fungicide frequency index
Treatment	
Untreated	0
Standard	4
First symptoms	4
Late application	3
Maturity-based model	3
TOMCAST	3
TOMCAST+Maturity-based model	3

Results-Sunds, 2016



	Fungicide frequency index
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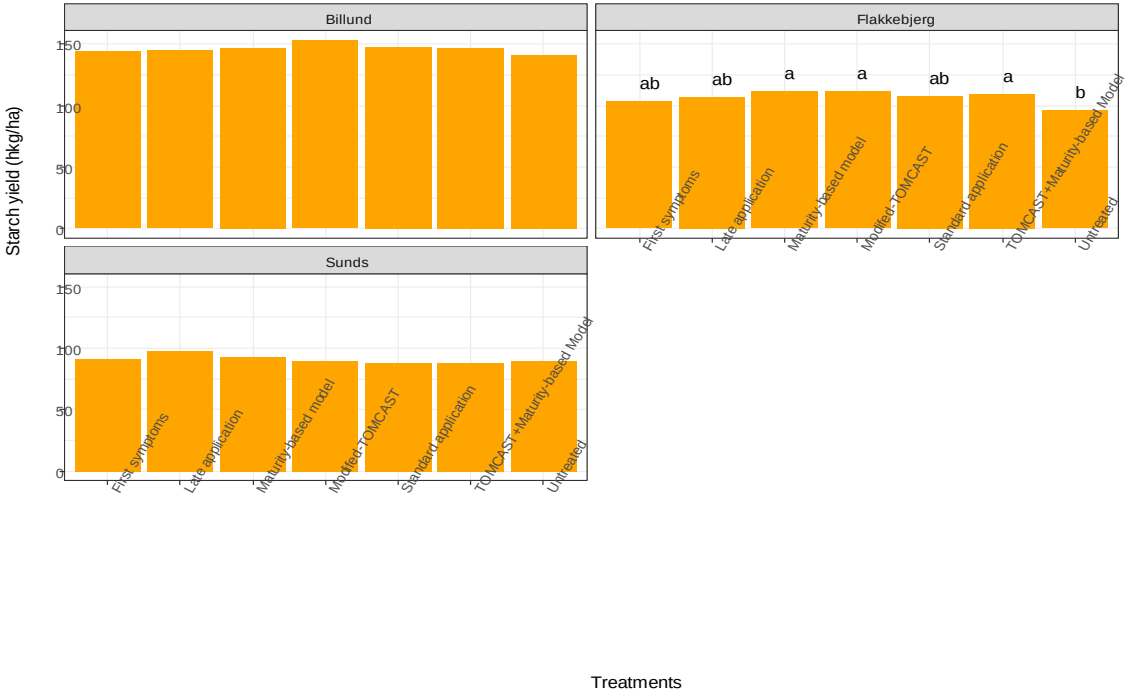
Starch yield (hkg/ha)



Conclusion

- Starting fungicide application at the onset of first attack can provide sufficient early blight control comparable to standard practice.

- Starting the application of fungicide 14 days after the onset of symptoms may be too late and thus loss of disease control.

- The Maturity-based model, Modified-TOMCAST and combining TOMCAST and Maturity-based model to offer the best control for early blight without yield penalties.

Conclusion (cont'd)

- The effective early blight control obtained from the Maturity-based model, Modified TOMCAST and TOMCAST+Maturity-based model at all the locations suggest the applicability of such models in practice.

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