



Innovation for a profitable and ecologically balanced management of foliar diseases in sugar beet

Bram Hanse (IRS) and Arjen Buijze (Cosun Beet Company)

Aim

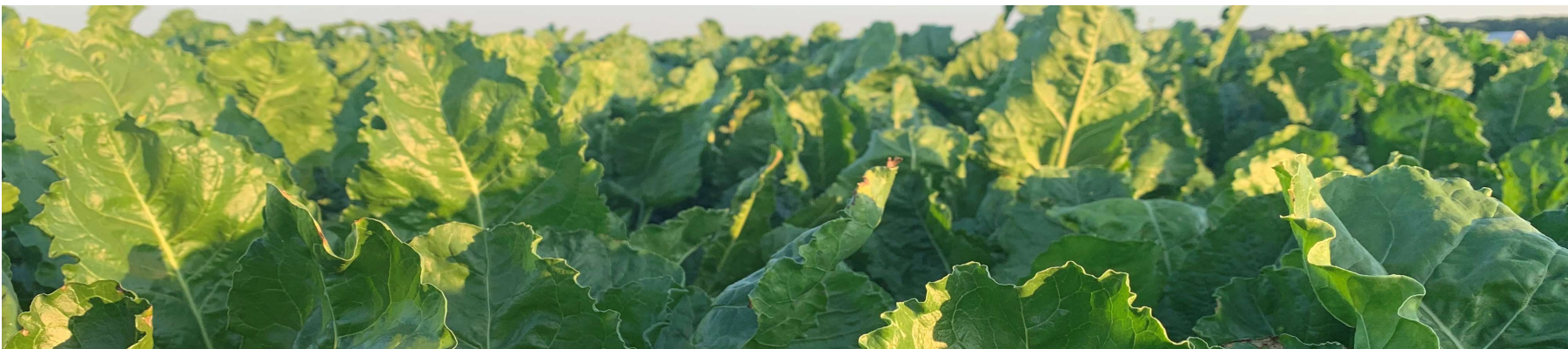
have like this

want to have like this



Cercospora in the Netherlands

- present in all sugar beet growing areas
- fairly good control in period 2004-2016
(2007-2017 *Stemphylium beticola* and *S. vesicarium* were the dominant foliar diseases)
- 2017-2023: increased pressure due to favourable conditions in summer
- loss of propiconazole, epoxiconazole, cyproconazole



Dutch isolates 2018

96.8% of isolates carries G143A mutation causing strobilurin resistance

DMI	Isolates (%)				Last year of use
	EC50>1	EC50>10	RF>30	RF>60	
epoxiconazole	9.5	0	9.5	0	2020
difenoconazole	23.8	0	42.9	17.5	?
cyproconazole	95.2	9.5	9.5	1.6	2022

RF: Resistance Factor (Nikou et al., 2009)

= EC50/average of two susceptible reference isolates

1-10 sensitive
 >10-30 moderately resistant
 >30-60 resistant
 >60-120 highly resistant



Impact cercospora

At 80,000 ha an average loss of:
(@ 17% and 45 euro/ton beet)

2020: 424 euro/ha

2021: 159 euro/ha

2022: 238 euro/ha



Despite the management of foliar diseases!!!

Spray applications susceptible varieties

■ additives to tankmix

- what's new in mixing Cu or S?

■ new a.i. of synthetic fungicides

- prothioconazole, mefentrifluconazole, fluxapyroxad
- increase in efficacy when used in program

■ plant extracts, biologicals and biostimulants

- hard to find some that have positive effect

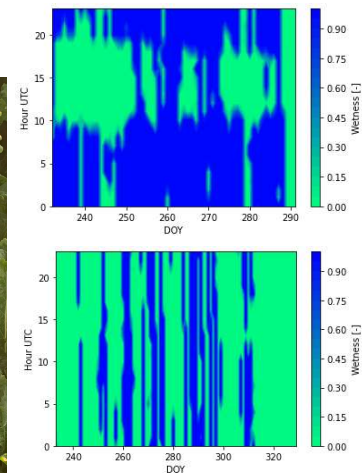
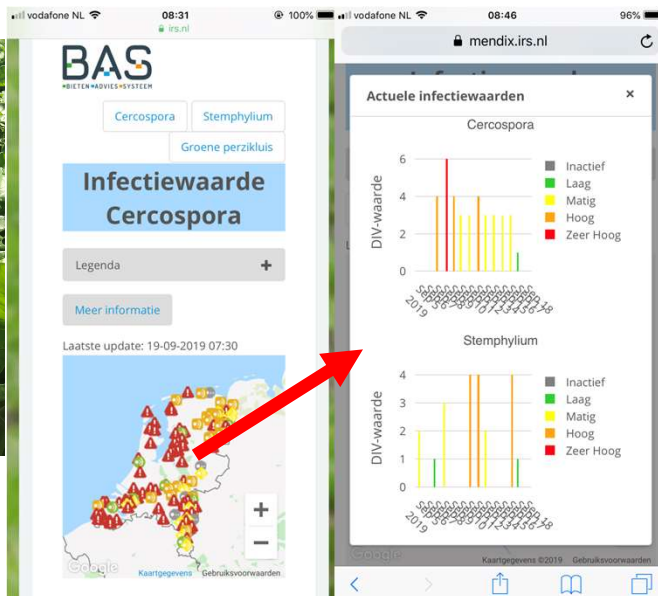
■ elicitors (variable results)

- chitosan hydroxychloride: maintains efficacy while reducing number of fungicide applications
- acibenzolar-s-methyl: increased efficacy



Infection forecast model

- **more precise placement of applications**
 - earlier applications (before symptoms)
 - possibly more applications (when monitoring is skipped)
 - can be improved by adding a geo-physical leaf wetness model to predict free water on the leaves



Combinations for better efficacy

- **elicitors had significant efficacy on resistant varieties**
 - chitosan hydroxychloride
 - acibenzolar-s-methyl
- **on resistant varieties less fungicide applications**
- **efficacy of triazoles higher on resistant varieties**
- **infection models for monitoring visits and application interval in resistant varieties**



Effect of resistant variety



Annemartha KWS BC=8

photo: 17-10-2022

21-6-2022 Charge 3 L/ha
5-7-2022 Spyrale 1 L/ha + Microthiol 3 L/ha
28-7-2022 Bicanta 1 L/ha + Microthiol 3 L/ha
18-8-2022 Spyrale 1 L/ha + Vitalosol 3 L/ha
7-9-2022 Bicanta 1 L/ha + Vitalosol 3 L/ha

cost mangement foliar diseases: **422 euro/ha** (140+282)
financial yield: 6062 euro/ha*



Reforma KWS BC=9

photo: 17-10-2022

28-7-2022 Spyrale 1 L/ha
18-8-2022 Bicanta 1 L/ha
7-9-2022 Spyrale 1 L/ha

cost mangement foliar diseases: **189 euro/ha** (84 +105)

resistance fee seeds: **70 euro/ha**

total: **259 euro/ha**

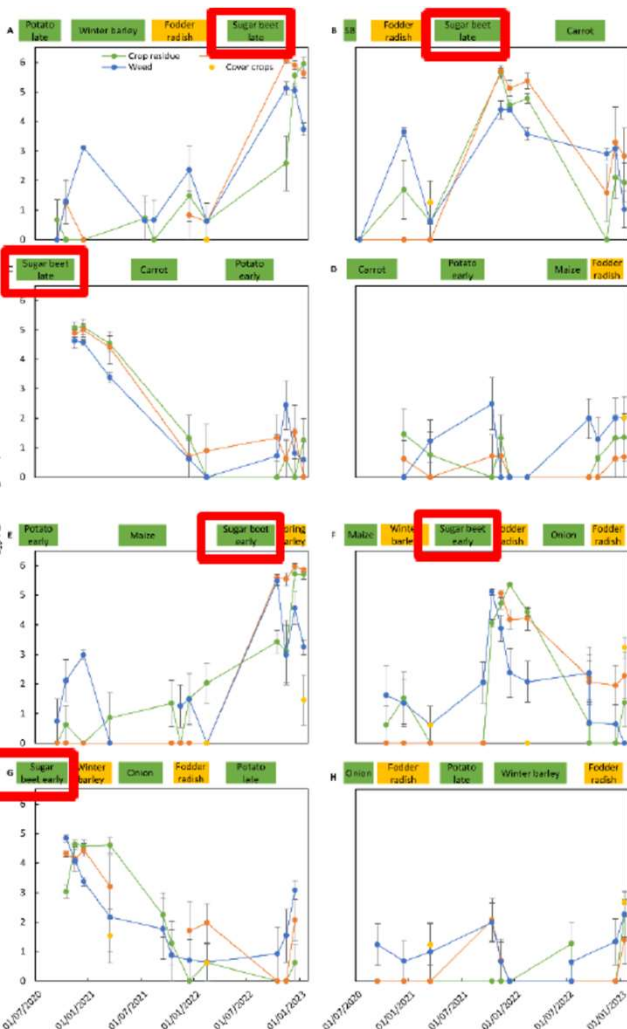
Financial yield: 7234 euro/ha*



* financial yield calculated with 50 euro/ton at 17.0% sugar without cost mangement foliar diseases

Agronomical measures

- crop rotation
- field hygiene
- crop residue management
 - faster decomposition sugar beet residues
 - competition on residues
 - active breakdown of cercospora in soil



Conclusions

- **not all effective measures are ‘new’**
- **combination of variety and measures necessary**
- **perspective for improvement of infection models**
- **perspective on management by influencing survival of cercospora on crop residue**





IRS *Institute of Sugar Beet Research*

Postal address Postbus 20
4670 AA Dinteloord
Visiting address Kreekweg 1
4671 VA Dinteloord

Telephone +31 (0)165 516 070

irs@irs.nl
www.irs.nl



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hanse@irs.nl