STROBILURIN RESISTANCE OF POWDERY MILDEW IN DENMARK AND SWEDEN

THIES MARTEN HEICK AND ANNE LISBET HANSEN

AARHUS UNIVERSITY
DEPARTMENT OF AGROECOLOGY

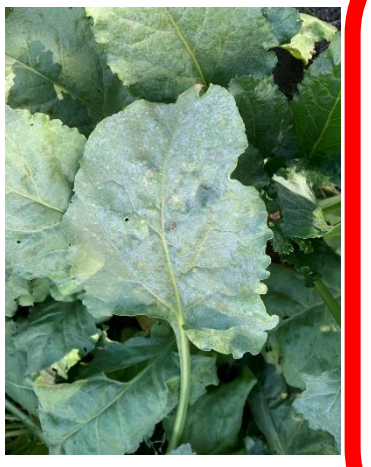
FUNGAL DISEASES IN SB IN DENMARK

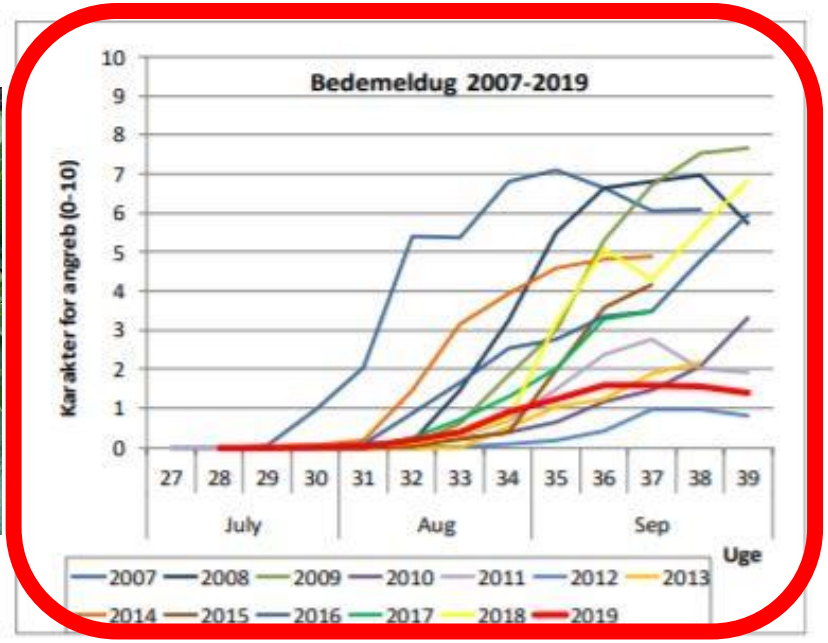
Erysiphe betae

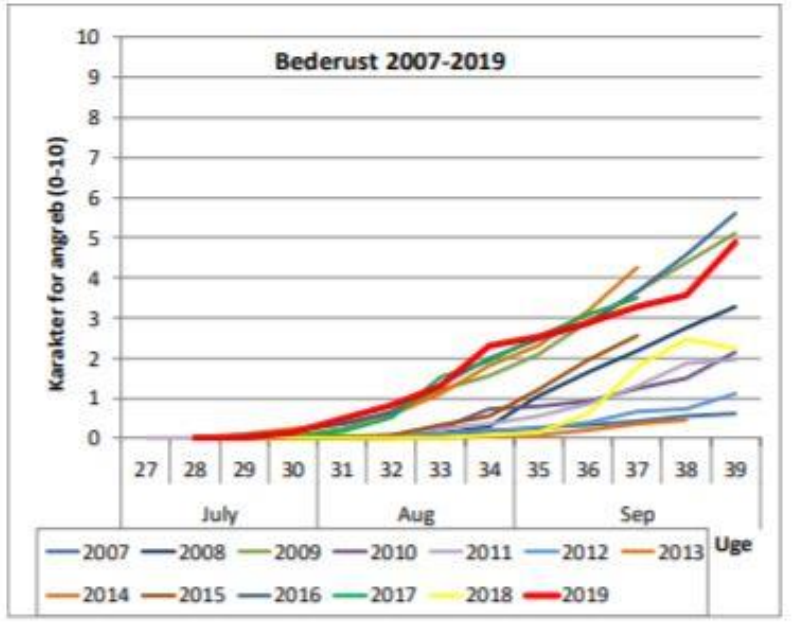
Uromyces betae

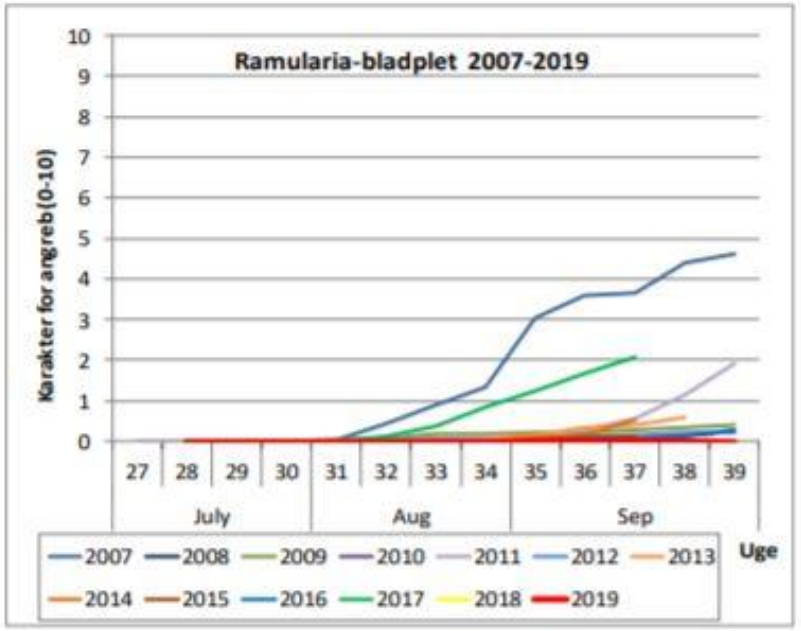
Ramularia beticola

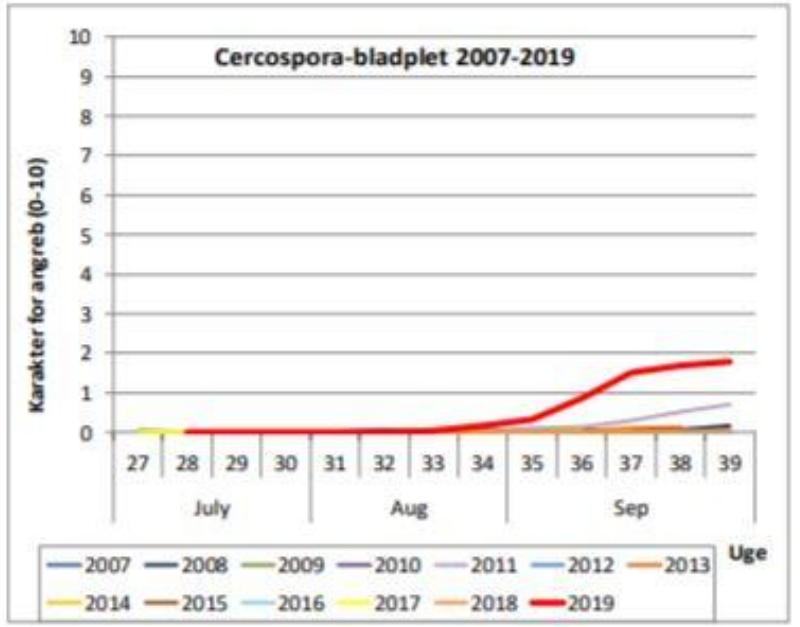
Cercospora beticola




Bedemeldug 2007-2019
Karakter for angreb (0-10)
0 1 2 3 4 5 6 7 8 9 10
27 28 29 30 31 32 33 34 35 36 37 38 39
July Aug Sep
Uge
2007 2008 2009 2010 2011 2012 2013
2014 2015 2016 2017 2018 2019


Bederust 2007-2019
Karakter for angreb (0-10)
0 1 2 3 4 5 6 7 8 9 10
27 28 29 30 31 32 33 34 35 36 37 38 39
July Aug Sep
Uge
2007 2008 2009 2010 2011 2012 2013
2014 2015 2016 2017 2018 2019


Ramularia-bladplet 2007-2019
Karakter for angreb (0-10)
0 1 2 3 4 5 6 7 8 9 10
27 28 29 30 31 32 33 34 35 36 37 38 39
July Aug Sep
Uge
2007 2008 2009 2010 2011 2012 2013
2014 2015 2016 2017 2018 2019


Cercospora-bladplet 2007-2019
Karakter for angreb (0-10)
0 1 2 3 4 5 6 7 8 9 10
27 28 29 30 31 32 33 34 35 36 37 38 39
July Aug Sep
Uge
2007 2008 2009 2010 2011 2012 2013
2014 2015 2016 2017 2018 2019

FUNGICIDE RECOMMENDATIONS

Leaf diseases ought to be treated when see in the field, at lastest when disease incidence reached 5%.

Until 2020

- 0.25 – 0.50 l/ha Opera (epox[illegible]nazole + pyraclostrobin)

or

- 0.25 – 0.50 l/ha Rubric (epox[illegible]nazole)

or

- 0.25 – 0.50 l/ha Amistar Gold (difenoconazole + azoxystrobin)

From 2021:

Amistar Gold

evt. Propulse (fluopyram + prothioconazole), Balaya (mefentrifluconazole + pyraclostrobin)

POWDERY MILDEW RESISTANCE TESTING

Since 2013

Collection of PM populations from DK and SWE.

Sugar beet plants (Julietta (KWS)/ Lombok (SESvdH))
GS 16-19

Transfered by rubbing, incubated 24 h in the dark (20°C/ high RH)

Curative spray: Untreated | 0.5 l/ha Comet Pro | 0.5 l/ha Opus/Opera

'Semi field' - frequently checked for beginning PM.

FIRST FOUND OF RESISTANCE 2015

Results 2019 – assessment of *E. betae* for 14 locations 10 dai.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Untreated	+++	+++	++	+++	+++	+++	++	+++	+++	+++	+++	+++	+++	+++
0.5 l/ha Comet Pro	-	+	-	-	-	+	-	+++	-	+++	++	+++	-	+
0.5 l/ha Opera	-	-	-	-	-	-	-	-	-	+	-	-	-	-
4 l/ha Serenade*	++	+++	++	++	+	+++	++	+	+++	+++	+++	+++	+++	++

The first samples not controlled by solo pyraclostrobin was found in 2015 in DK, and again in 2017, 2018, 2019, and 2020 in DK and SWE.

The presence of G143A was confirmed by sequencing using primers by Neher & Bolton (2014).

* Bacillus amolyliquefaciens

Plant Health Progress ◆ 2019 ◆ 20:179 https://doi.org/10.1094/PHP-01-19-0004-BR

Plant Health Brief

QoI Resistance in Sugar Beet Powdery Mildew (*Erysiphe betae*) in Scandinavia

Thies Marten Heick,[1,†] Anne Lisbet Hansen,[2] Annemarie Fejer Justesen,[1] and Lise Nistrup Jørgensen[1]

[1] Aarhus University, Flakkebjerg, Department of Agroecology, 4200 Slagelse, Denmark
[2] NBR Nordic Beet Research, Sofiehøj, 4960 Holeby, Denmark

Accepted for publication 17 June 2019.

Keywords: quinone outside inhibitors, fungicide resistance, field crops

Powdery mildew caused by *Erysiphe betae* is one of the major fungal diseases in sugar beet in Denmark and Sweden (Francis et al. 2007; Hansen 2019). Frequent applications of fungicides mitigate

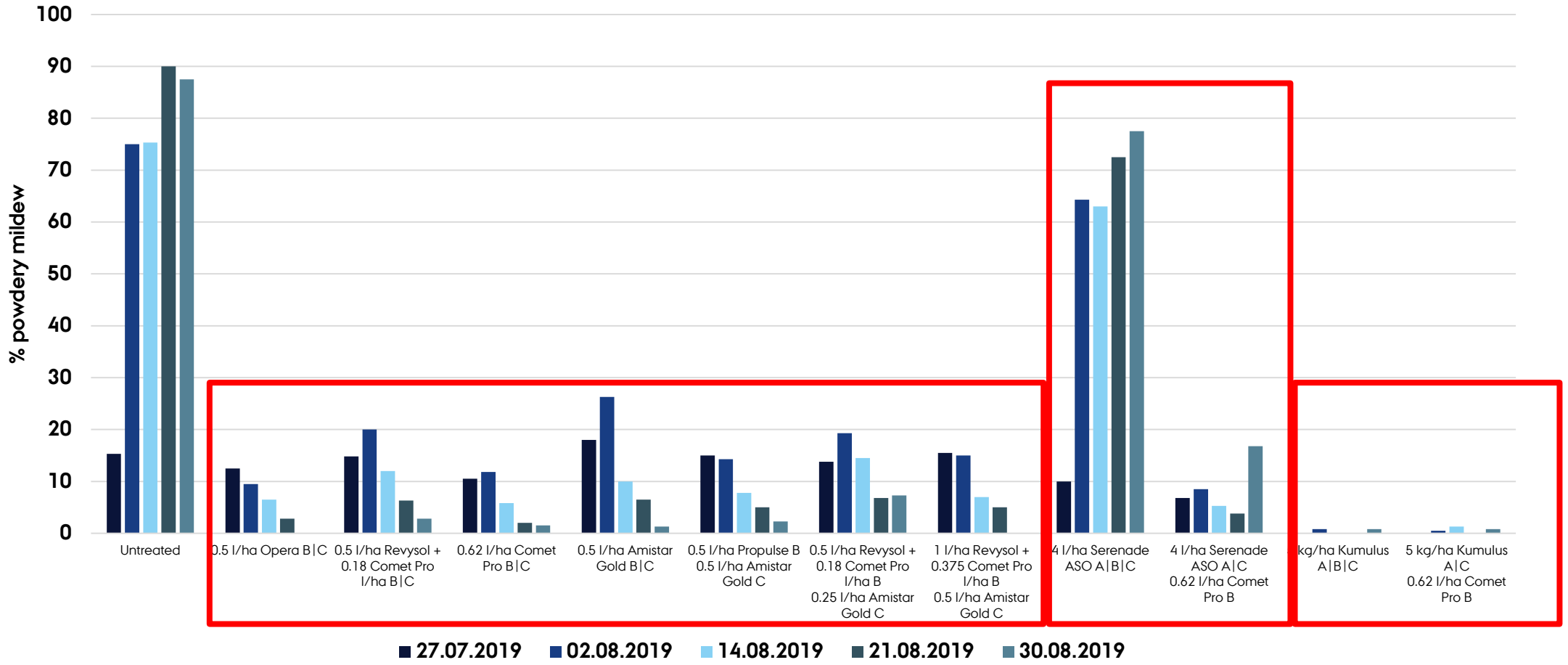
QoI resistance in powdery mildew on sugar beet was reported previously from fields treated with pyraclostrobin or trifloxystrobin in the United States and has been associated with the presence of

FIELD TRIALS

Entry	T0	T1	T2
		(beginning attacks)	(T1 + 21 dage)
1		Untreated	
2		0.25 l/ha Opera	0.25 l /ha Opera
3		0.375 l/ha Balaya	0.375 l/ha Balaya
4		0.31 l/ha Comet Pro	0.31 l/ha Comet Pro
5		0.25 l/ha Amistar Gold	0.25 l/ha Amistar Gold
6		0.25 l/ha Propulse	0.25 l/ha Amistar Gold
7		0.375 l/ha Balaya	0.31 l/ha Comet Pro
8		0.75 l/ha Balaya	0.62 l/ha Comet Pro
9	4 l/ha Serenade ASO	4 l/ha Serenade ASO	4 l/ha Serenade ASO
10	4 l/ha Serenade ASO	0.31 l/ha Comet Pro	4 l/ha Serenade ASO
11	5 kg/ha Kumulus* S	5 kg/ha Kumulus S	5 kg/ha Kumulus S
12	5 kg/ha Kumulus S	0.31 l/ha Comet Pro	5 kg/ha Kumulus S

* Sulfur

POWDERY MILDEW | GULDBORG



SUMMARY

- Strobilurin resistance in Europe
- How is the situation outsite of Scandinavia?
- No decreased field efficacy, yet!
- Common practise (mixing and alterating) should help reducing the risk of spread
- Also ”new” chemistry is effective against PM
- Still, a vulnerable situation (resistance management)

- Sulfur as a ‘resistance breaker’?
- Serenade does not work

Financed by sukkerroeafgiftsfonden and BASF A/S