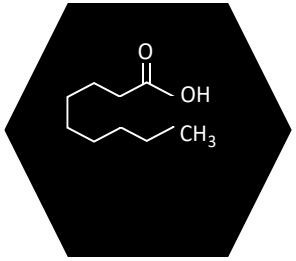
Structure

I. Introduction



II. Field results

a. apple scab

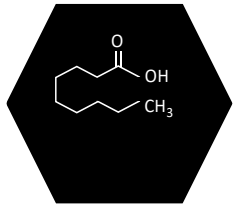
b. mildew

c. fruit russeting

III. Summary

BÖLN
Bundesprogramm Ökologischer Landbau
und andere Formen nachhaltiger
Landwirtschaft

I. Introduction NEU 1143 F



- Active substance: Iron salt of fatty acids
- a fatty acid fungicide with broad spectrum efficacy against a variety of fungal pathogens (apple scab, rust, powdery mildew, leaf spot diseases, peach leaf curl)
- unspecific mode of action → low risk of resistance development
- product suitable for organic production → copper reduction
- no fungicide authorisation so far

Field results 2017-2021

part I: all season Neu1143F vs. Copper

part II: primary season: Neu1143F vs. lime sulphur

part III: powdery mildew and fruit russeting

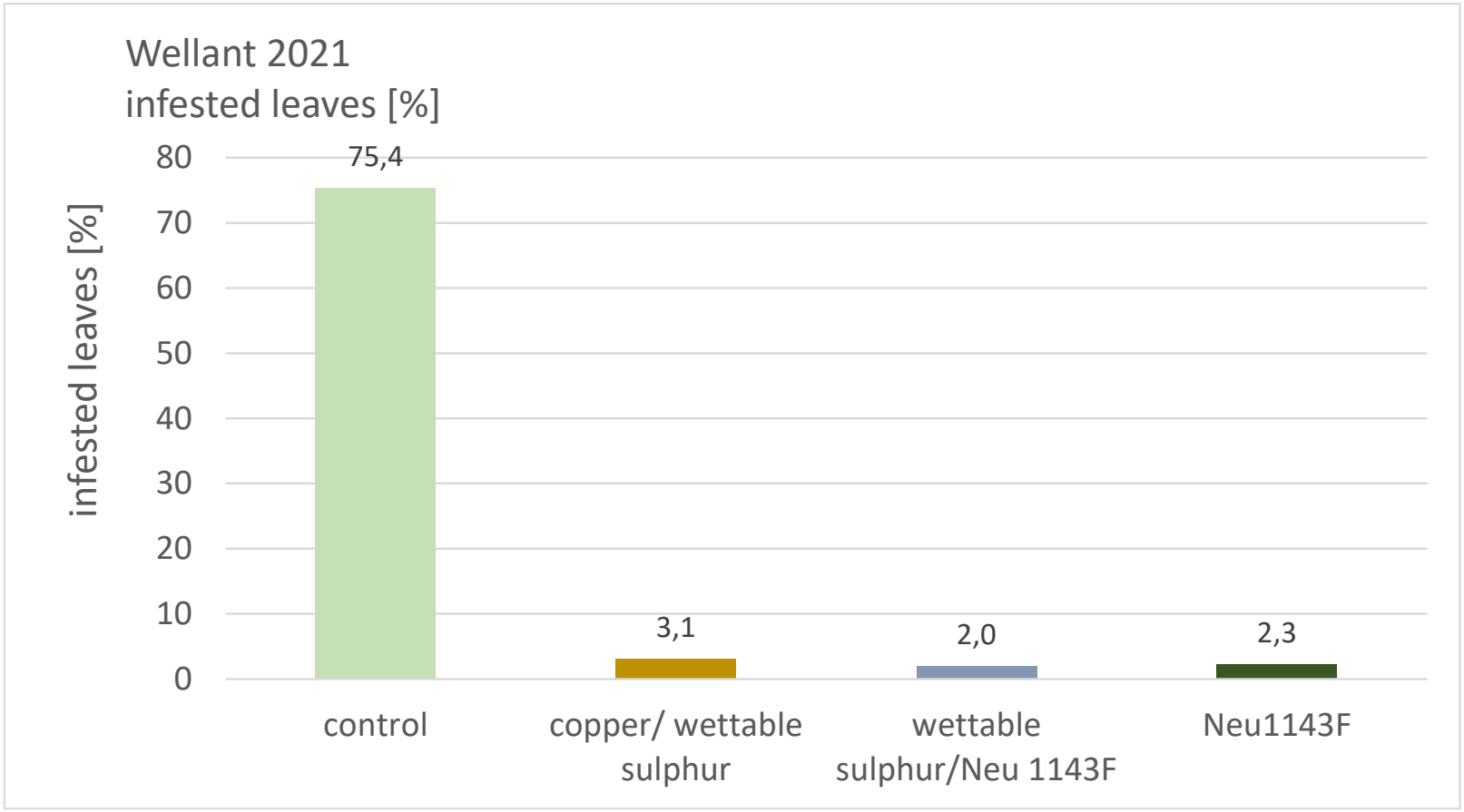
part IV: adhesive agents/ surfactants

BÖLN
Bundesprogramm Ökologischer Landbau und andere Formen nachhaltiger Landwirtschaft

II. field results – long shoots

Efficacy of Neu 1143F and copper/ wettable sulphur applied solo

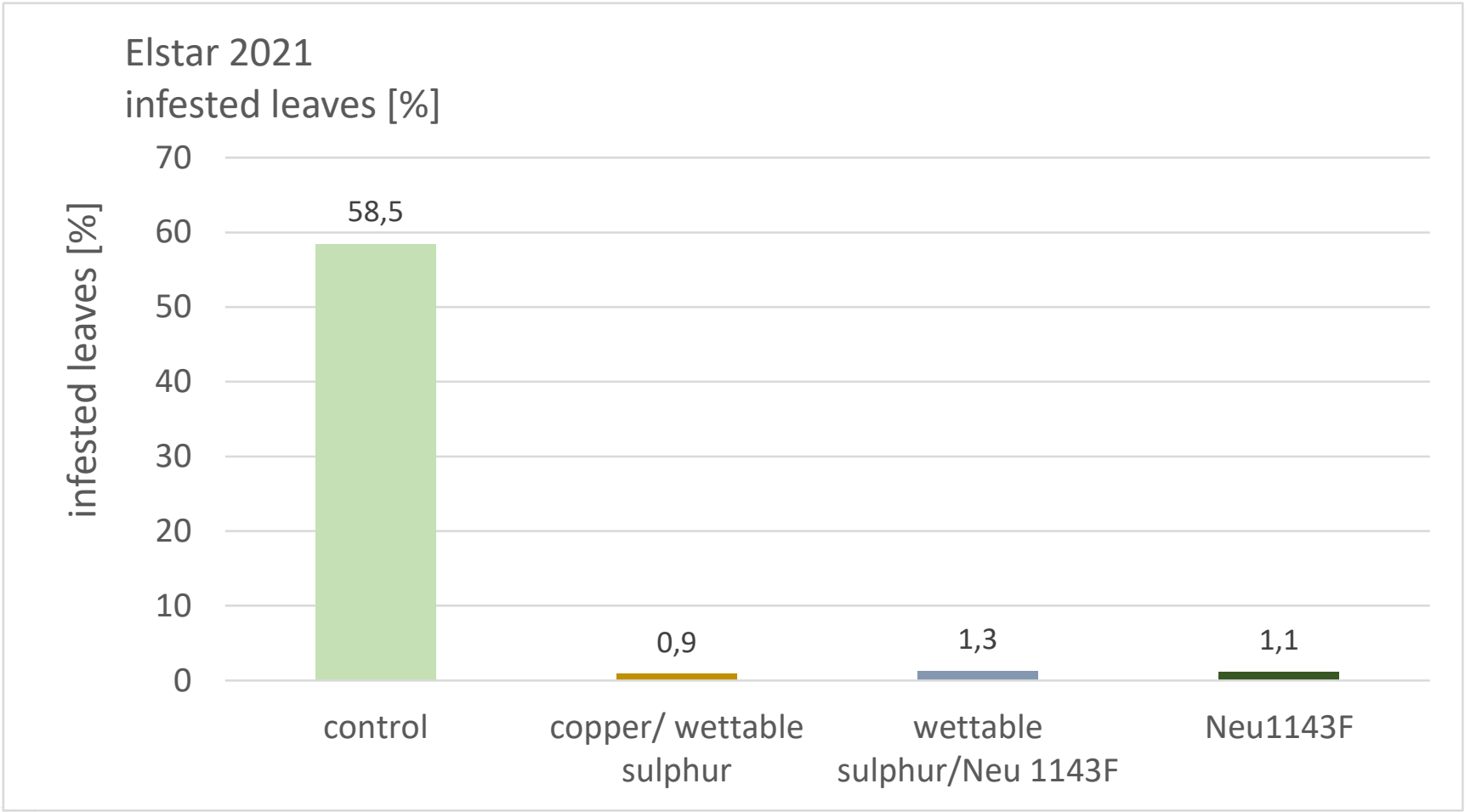
ÖON (Wellant 2021) – Cu/ ws - Neu1143/ws and Neu1143



II. field results – long shoots

Efficacy of Neu 1143F and copper/ wettable sulphur applied solo

ÖON (Elstar 2021) – Cu/ ws - Neu1143/ws and Neu1143



Field results 2017-2021

part I: all season Neu1143F vs. Copper

part II: primary season: Neu1143F vs. lime sulphur

part III: powdery mildew and fruit russeting

part IV: adhesive agents/ surfactants

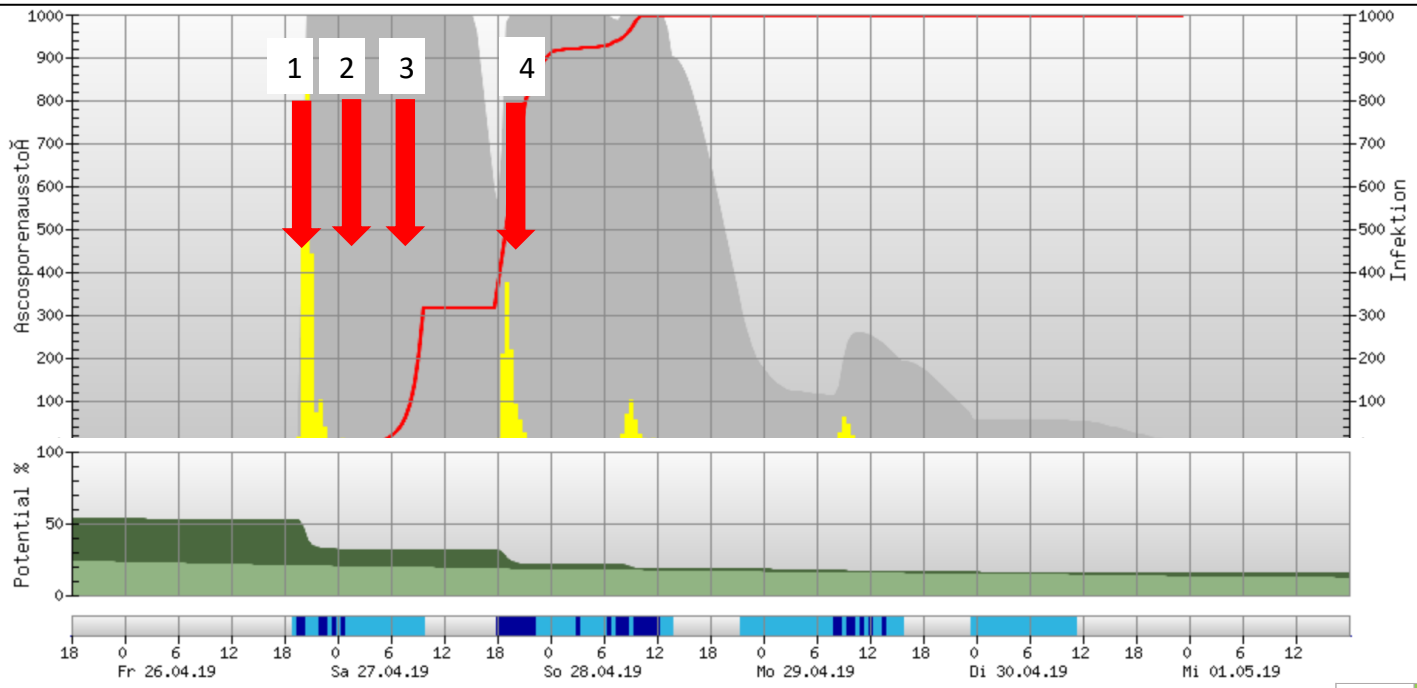
field results: primary saison
variety: Elstar (ÖON)

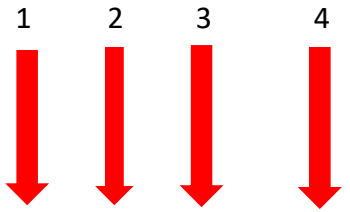
→ this procedure took place in the primary season 3 times in important infection periods

→ only in these 3 treatment periods no treatment took place in the untreated control

variant		description	protective	infection	6 h after infection	12 h after infection	24 h after infection
8	Neu 1143F	copper/ wettable sulphur + Neu 1143F	copper/ w s				Neu 1143F
7	lime sulphur	copper/ wettable sulphur + ls	copper/ w s				l s
6	Neu 1143F	copper/ wettable sulphur + Neu 1143F	copper/ w s			Neu 1143F	
5	lime sulphur	copper/ wettable sulphur + ls	copper/ w s			l s	
4	Neu 1143F	copper/ wettable sulphur + Neu 1143F	copper/ w s		Neu 1143F		
3	Neu 1143F	copper/ wettable sulphur + Neu 1143F	copper/ w s	Neu 1143F			
2	lime sulphur	copper/ wettable sulphur + ls	copper/ w s	l s			
1	u c	copper/ w s	copper/ w s				

1st application: 26.4/ 27.4

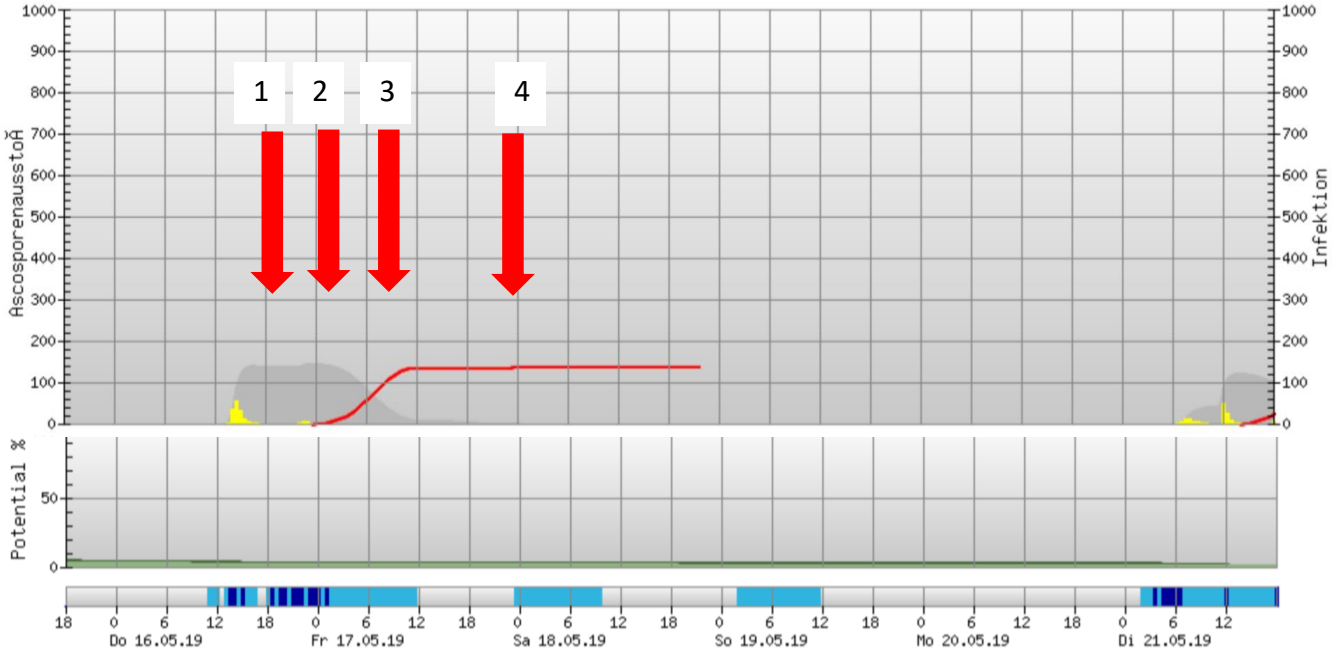


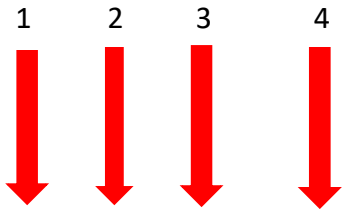


no.	application date	variant	treatment	time	
0	untreated control	1	untreated control		
1	26th of april, Friday	2 3	lime sulphur Neu 1143F	19.30	infection
2	27th of april, Saturday	4	Neu 1143F	1.30	(6 h)
3	27th of april, Saturday	5 6	lime sulphur Neu 1143F	7.30	(12 h)
4	27th of april, Saturday	7 8	lime sulphur Neu 1143F	19.30	(24 h)

variant	infection	6 h after infection	12 h after infection	24 h after infection
8				Neu 1143F
7				ls
6			Neu 1143F	
5			ls	
4		Neu 1143F		
3	Neu 1143F			
2	ls			
1				

2nd application: 16.5/ 17.5

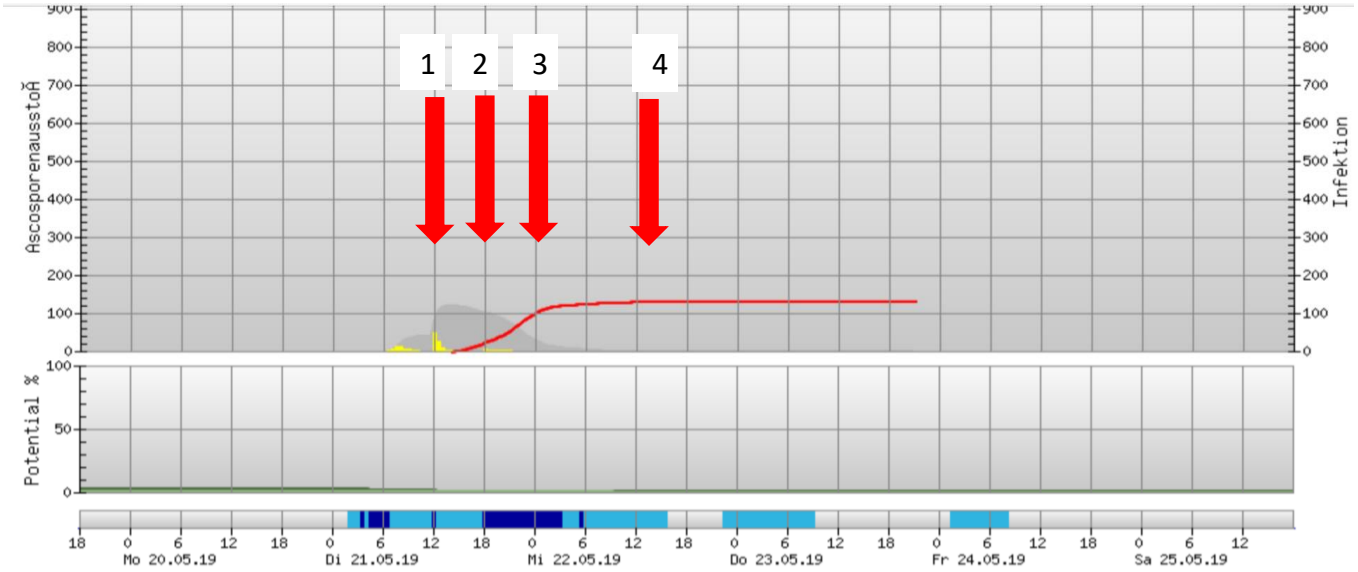


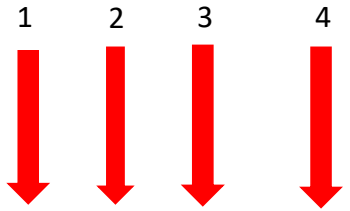


no.	application date	variant	treatment	time	
0	untreated control	1	untreated control	-	
1	16th of may, thursday	2 3	lime sulphur Neu 1143F	17.00	infection
2	16th of may, thursday	4	Neu 1143F	23.00	(6 h)
3	17th of may, Friday	5 6	lime sulphur Neu 1143F	5.00	(12 h)
4	17th of may, friday	7 8	lime sulphur Neu 1143F	17.00	(24 h)

variant	infection	6 h after infection	12 h after infection	24 h after infection
8				Neu 1143F
7				ls
6			Neu 1143F	
5			ls	
4		Neu 1143F		
3	Neu 1143F			
2	ls			
1				

3rd application: 21.5/ 22.5

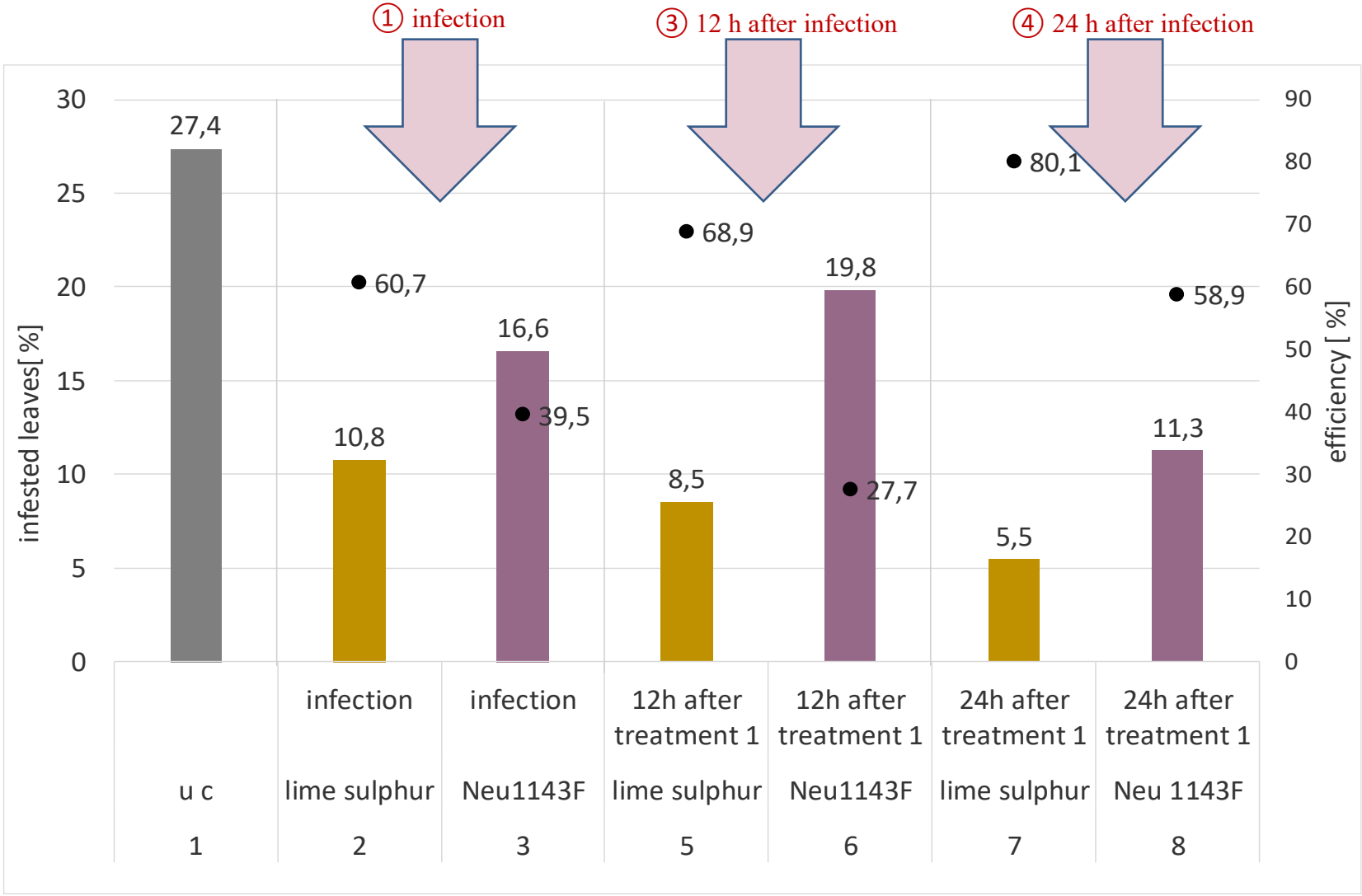




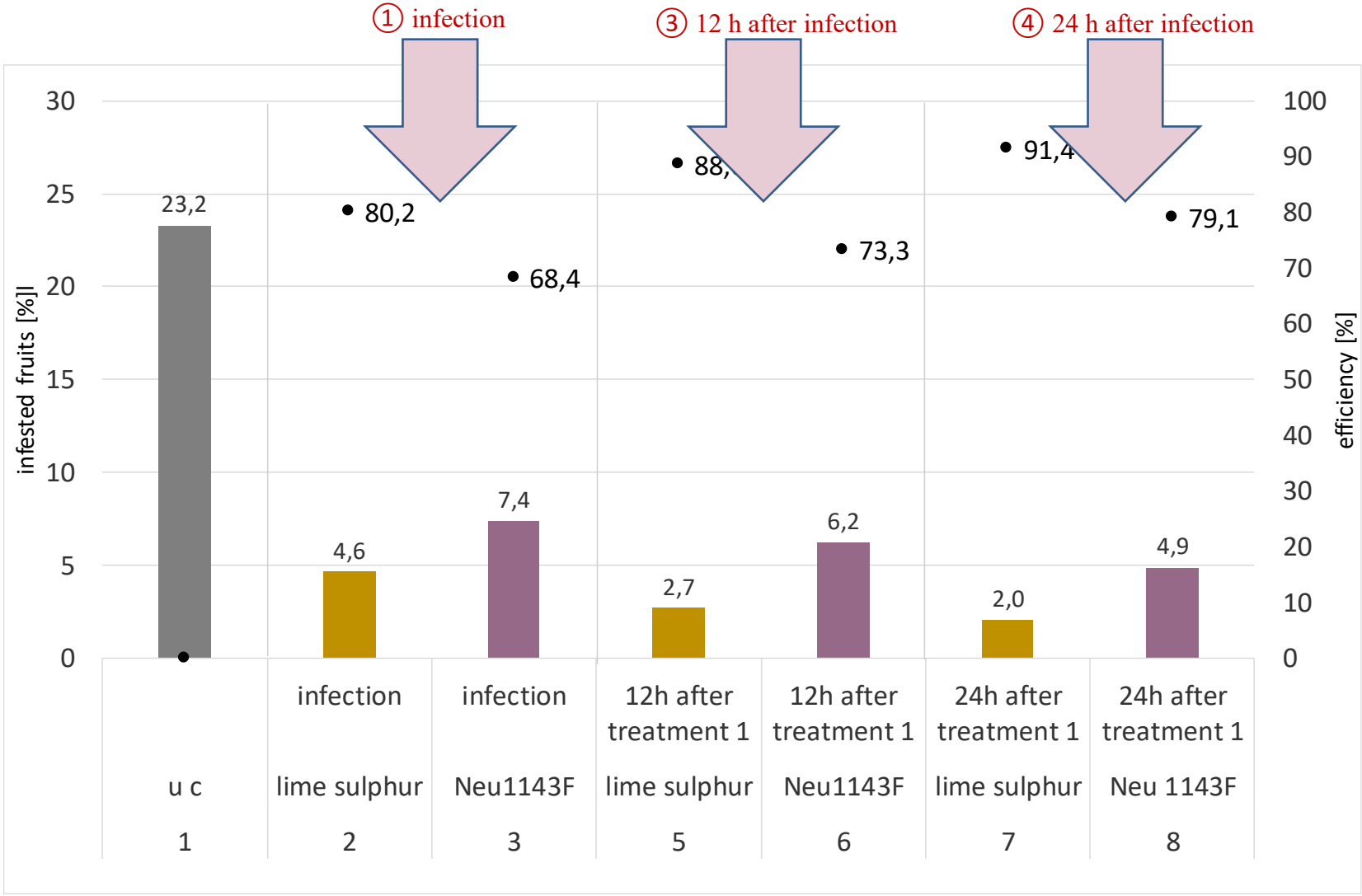
no.	application date	variant	treatment	time	
0	untreated control	1	untreated control	-	
1	21th of may, Tuesday	2 3	lime sulphur Neu 1143F	12.00	infection
2	21th of may, tuesday	4	Neu 1143F	18.00	(6 h)
3	21th of may, tuesday	5 6	lime sulphur Neu 1143F	24.00	(12 h)
4	22th of may, Wednesday	7 8	lime sulphur Neu 1143F	12.00	(24 h)

variant	infection	6 h after infection	12 h after infection	24 h after infection
8				Neu 1143F
7				ls
6			Neu 1143F	
5			ls	
4		Neu 1143F		
3	Neu 1143F			
2	ls			
1				

II. field results – long shoots Lime sulphur vs. Neu1143F (Elstar 2019)



II. field results – fruits Lime sulphur vs. Neu1143F (Elstar 2019)



Field results 2017 - 2021

part I: all season Neu1143F vs. Copper

part II: primary season: Neu1143F vs. lime sulphur

part III: powdery mildew and fruit russeting

part IV: adhesive agents/ surfactants

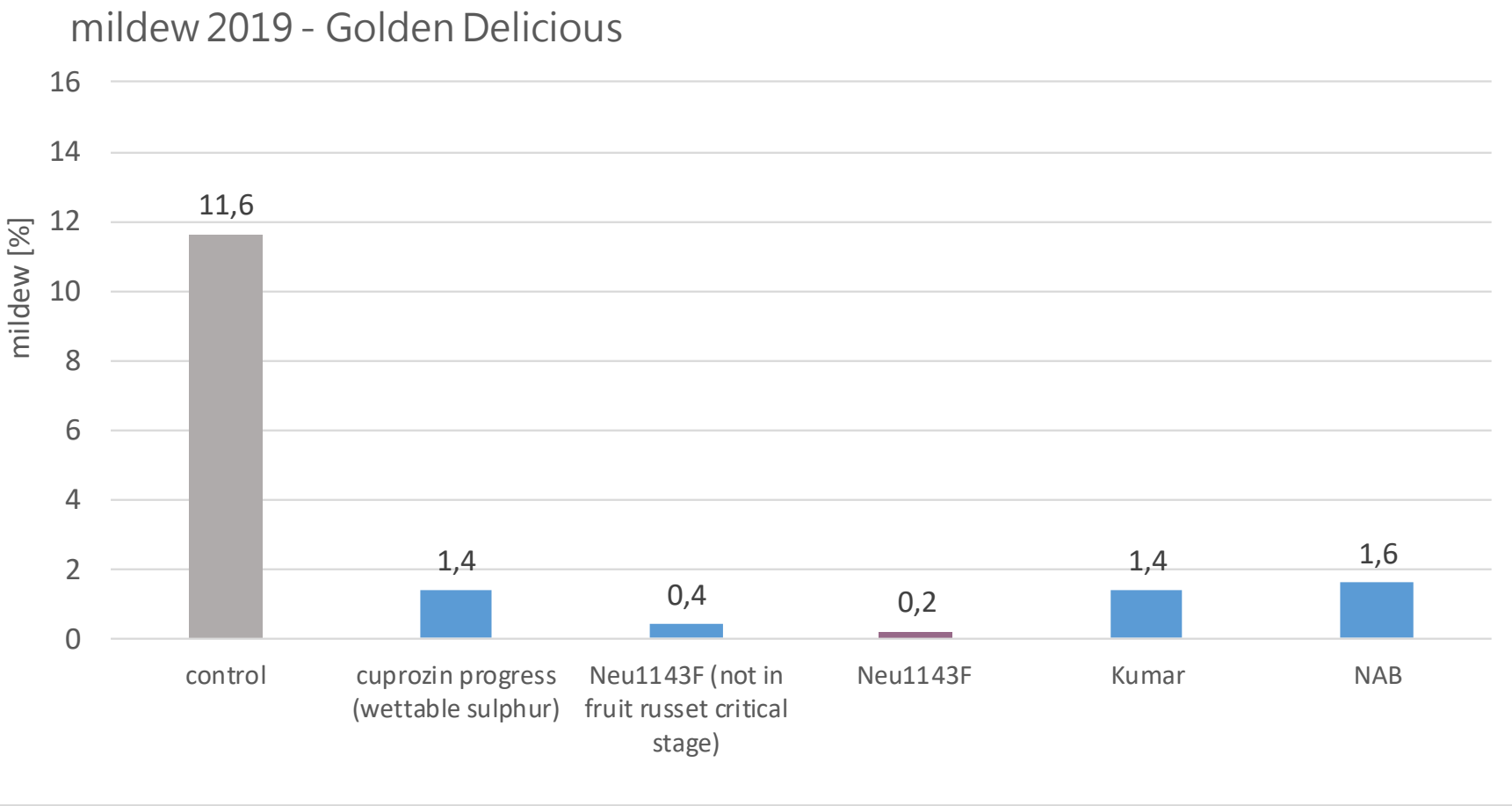
field results primary season 2019: Powdery mildew and fruit russeting

DLR Golden Delicious

Variant		Treatment	protective
1	**untreated control**	---	---
2	**cuprozin progress** (from begin flowering wettable sulphur)	**02.04. / 04.04. / 08.04. / 18.04. / 30.04. / 07.05. / 15.05. / 24.05. / 29.05. / 14.06.** **(10 treatments)**	weekly submission or before rain event
3	**NEU 1143F** (not in fruit russeting critical stage))	**02.04. / 04.04. / 08.04. / 15.05. / 24.05. / 29.05. / 14.06.** **(7 treatments)**	weekly submission or before rain event
4	**NEU 1143F**	**02.04. / 04.04. / 08.04. / 18.04. / 30.04. / 07.05. / 15.05. / 24.05. / 29.05. / 14.06.** **(10 treatments)**	weekly submission or before rain event
5	**KUMAR**	**02.04. / 04.04. / 08.04. / 18.04. / 30.04. / 07.05. / 15.05. / 24.05. / 29.05. / 14.06.** **(10 treatments)**	2,5 l
6	**NAB**	**02.04. / 04.04. / 08.04. / 18.04. / 30.04. / 07.05. / 15.05. / 24.05. / 29.05. / 14.06.** **(10 treatments)**	weekly submission or before rain event

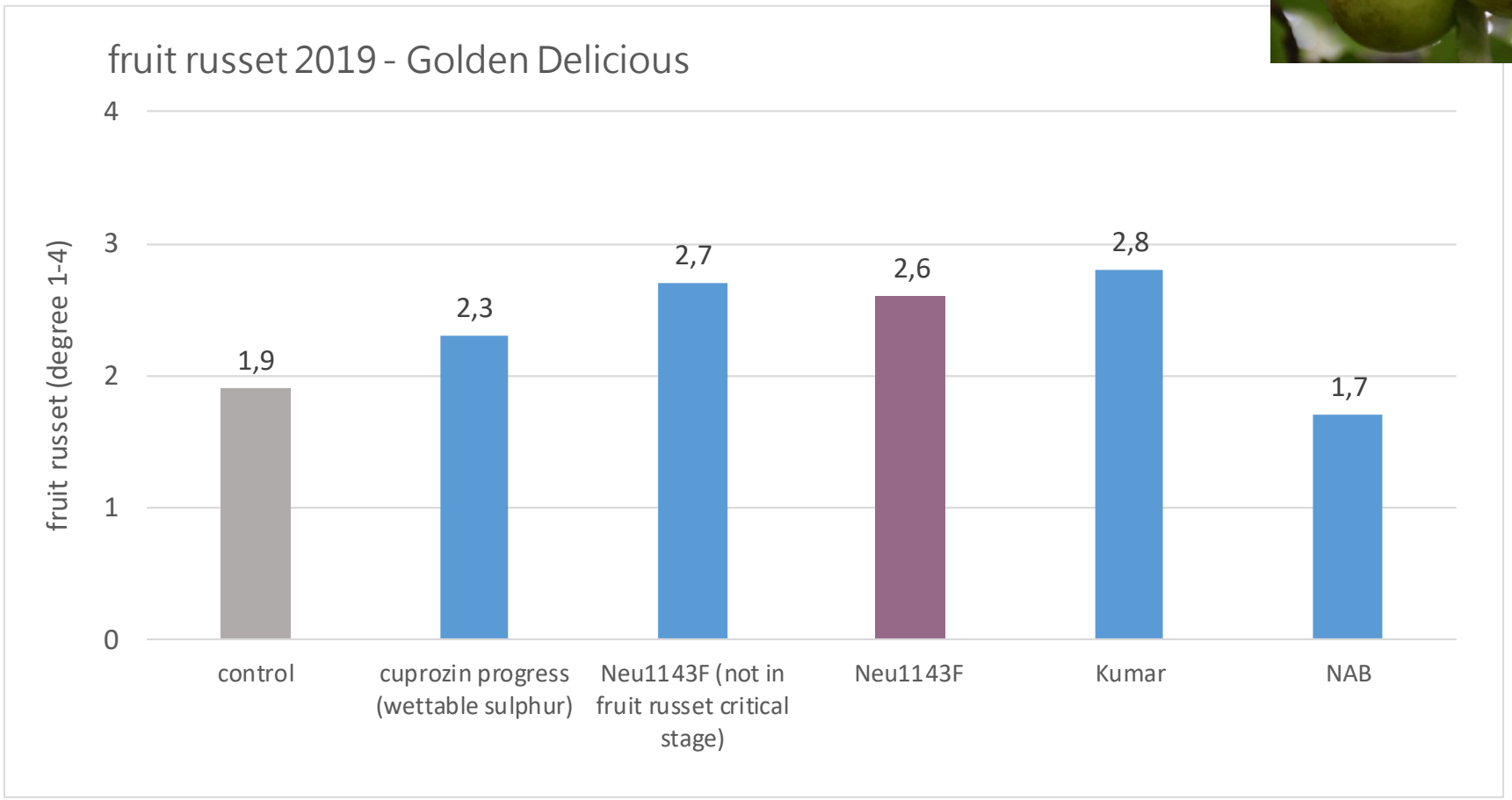
field results – powdery mildew 2019 - Golden Delicious (shoot tip/tree)

DLR 2019 - Golden Delicious



field results – fruit russeting 2019 - Golden Delicious

DLR 2019 - Golden Delicious



Field results 2017 - 2021

part I: all season Neu1143F vs. Copper

part II: primary season: Neu1143F vs. lime sulphur

part III: powdery mildew and fruit russeting

part IV: adhesive agents/ surfactants

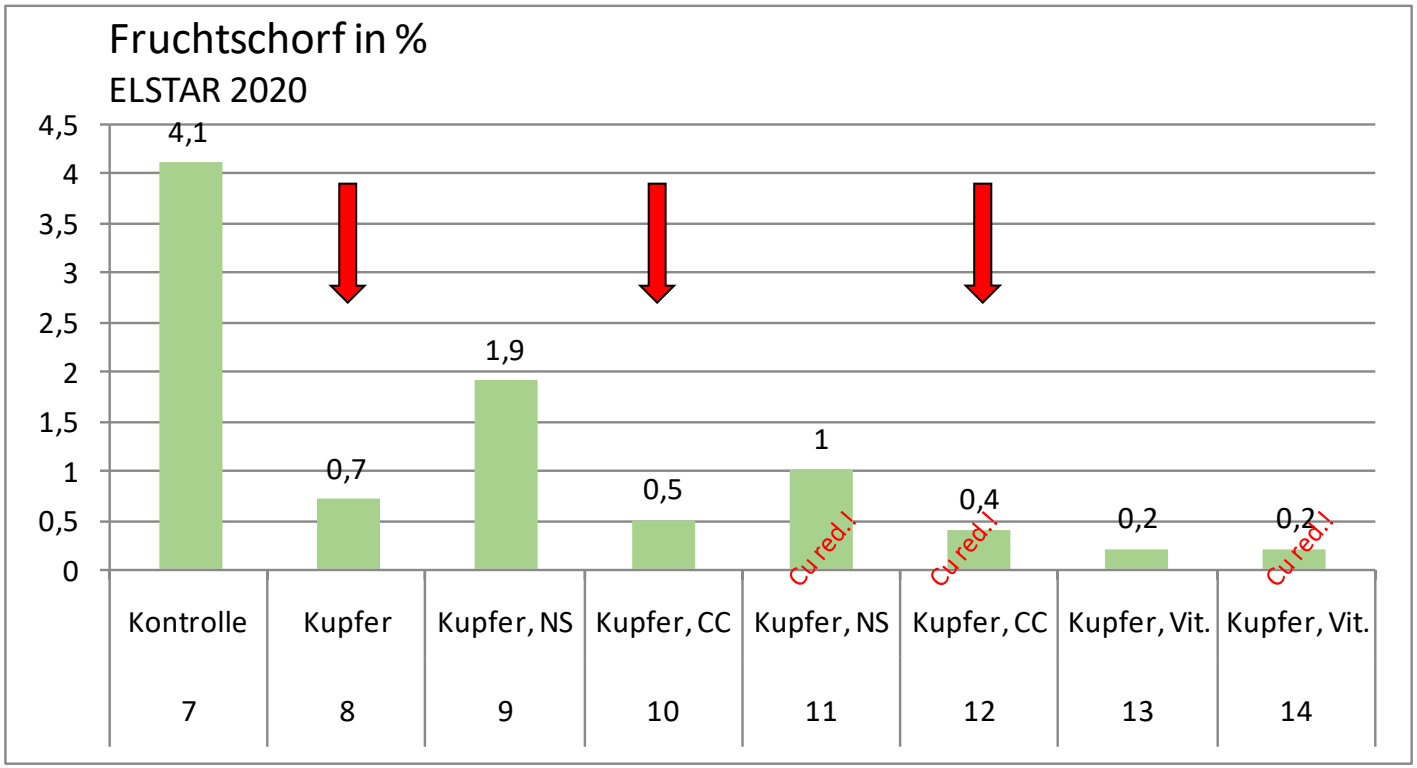
field results season 2020: adhesive agents/ surfactants

ÖON (Elstar 2020) – Use of CropCover combined with copper reduction

Nr.	Strategie	Präventiv
7	Kontrolle	-
8	Kupfer	Cuprozin progress, → 875g RCu/ha
9	Kupfer, NS	Cuprozin progress, Netzschwefel
10	Kupfer, CC	Cuprozin progress, Cropcover, → 875g RCu/ha
11	Kupfer, NS	Cuprozin progress red., Netzschwefel
12	Kupfer, CC	Cuprozin progress red. Cropcover → 438g RCu/ha
13	Kupfer, Vit.	Cuprozin progress, Vitisan
14	Kupfer, Vit.	Cuprozin progress red., Vitisan

field results season 2020: adhesive agents/ surfactants

ÖON (Elstar 2020) – Use of CropCover combined with copper reduction



field results season 2020: adhesive agents/ surfactants

KOB (Jonagored 2020) –CropCover and TS forte combined with copper reduction

Trial design:	4 repetitions (each with 23 trees)
Orchard:	cultivar: Jonagored, year of planting: 2010
Application:	nozzle: DG teejet 80015 VS green, water rate: 250 l/h/mch
Ratings:	scab on long shoot leaves scab on fruits

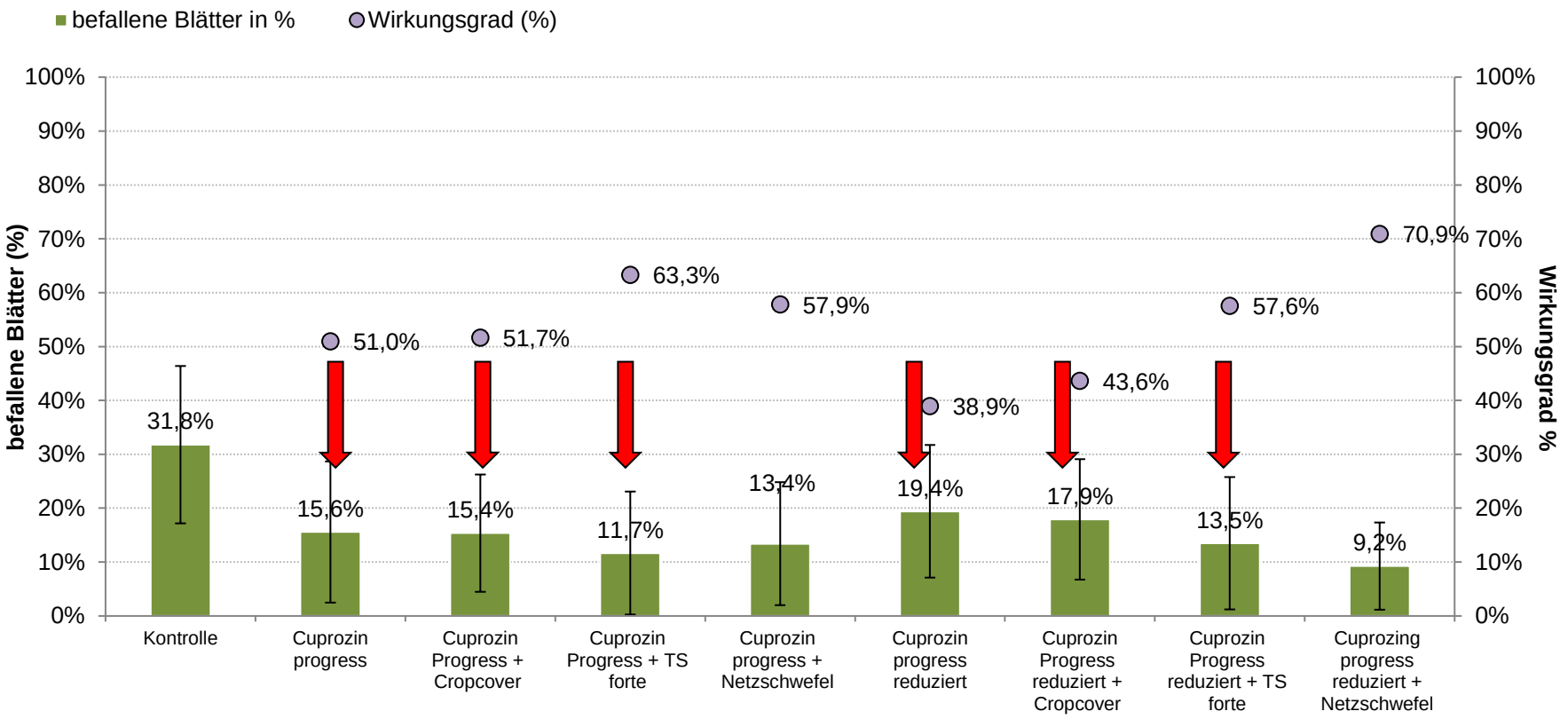
field results season 2020: adhesive agents/ surfactants

KOB (Jonagored 2020) –CropCover and TS forte combined with copper reduction

Variante	Präventive Behandlungen	Aufwandmengen (je Meter Kronenhöhe)	Anzahl Behandlungen	Kupfermenge	Infektion
1	-	-	-	-	betriebsüblich
2	Cuprozin progress	Cu-Menge: 150g, 150g, 100g, 50g,50g,50g,	6	1100g	
3	Cuprozin progress + Crop Cover	Cu-Menge: 150g, 150g, 100g, 50g,50g,50g, CropCover: 2,0 l/mKH	6	1100g	
4	Cuprozin progress + TS forte	Cu-Menge: 150g, 150g, 100g, 50g,50g,50g TS forte: 1,25 l/mKH	6	1100g	
5	Cuprozin progress + Netzschwefel	Cu-Menge: 150g, 150g, 100g, 50g,50g,50g, Netzschwefel: 2,5 kg/mKH	6	1100g	
6	Cuprozin progress reduziert	Cu-Menge: 100g, 100g, 75g, 37,5g, 37,5g, 37,5g	6	775g	
7	Cuprozin progress reduziert + Crop Cover	Cu-Menge: 100g, 100g, 75g, 37,5g, 37,5g, 37,5g Crop Cover: 2,0 l/mKH	6	775g	
8	Cuprozin progress reduziert + TS forte	Cu-Menge: 100g, 100g, 75g, 37,5g, 37,5g, 37,5g TS forte: 1,25 l/mKH	6	775g	
9	Cuprozin progress reduziert + Netzschwefel	Cu-Menge: 100g, 100g, 75g, 37,5g, 37,5g, 37,5g Netzschwefel: 2,5 l/mKH	6	775g	

field results season 2020: adhesive agents/ surfactants

KOB (Jonagored 2020) –CropCover and TS forte combined with copper reduction



field results season 2020: adhesive agents/ surfactants

LfULG (Gala 2020) –CropCover and TS forte combined with copper reduction

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Var.	Primärschorfsaison - Aufwandmenge pro ha (ca. 2,0 m Kronenhöhe)				Weiterbehandlung bis Ernte
	vorbeugend	pro ha	zu Infektionen	pro ha	
1	Cuprozin *progress* Standardaufwandmenge ab Blüte: Netzschwefel (NS), 4 - 2 kg/ha	1,0 - 0,5 l/ha = 250 - 125 g Cu	nur bei "schwerer" Infektion Schwefelkalk	16 ... 12 l/ha	vorbeugend: Netzschwefel ca. 4,0 - 2,0 kg/ha Infektion: Schwefelkalk (schwere Konidieninfektion) 12 l/ha
2	Cuprozin *progress* 25 % reduziert ab Blüte: NS (4 - 2 kg/ha)	0,75 - 0,37 l/ha = 187,5 - 94 g Cu			
3	Cuprozin *progress* Standardaufwandmenge + CropCover ab Blüte: NS (4 - 2 kg/ha)	1,0 - 0,5 l/ha = 250 - 125 g Cu + 4,0 l/ha			
4	Cuprozin *progress* 25 % reduziert + CropCover ab Blüte: NS (4 - 2 kg/ha)	0,75 - 0,37 l/ha = 187,5 - 94 g Cu + 4,0 l/ha			
5	Cuprozin *progress* Standardaufwandmenge + TS forte ab Blüte: NS (4 - 2 kg/ha)	1,0 - 0,5 l/ha = 250 - 125 g Cu + 2,5 l/ha			
6	Cuprozin *progress* 25 % reduziert + TS forte ab Blüte: NS (4 - 2 kg/ha)	0,75 - 0,37 l/ha = 187,5 - 94 g Cu + 2,5 l/ha			
7	Cuprozin *progress* Standardaufwandmenge + Netzschwefel ab Blüte: NS (4 - 2 kg/ha)	1,0 - 0,5 l/ha = 250 - 125 g Cu + 5,0 l/ha			
8	Cuprozin *progress* 25 % reduziert + Netzschwefel ab Blüte: NS (4 - 2 kg/ha)	0,75 - 0,37 l/ha = 187,5 - 94 g Cu + 5,0 l/ha			
9	unbehandelte Kontrolle	-----			

LfULG (Gala 2020) –CropCover and TS forte combined with copper reduction

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Freistaat
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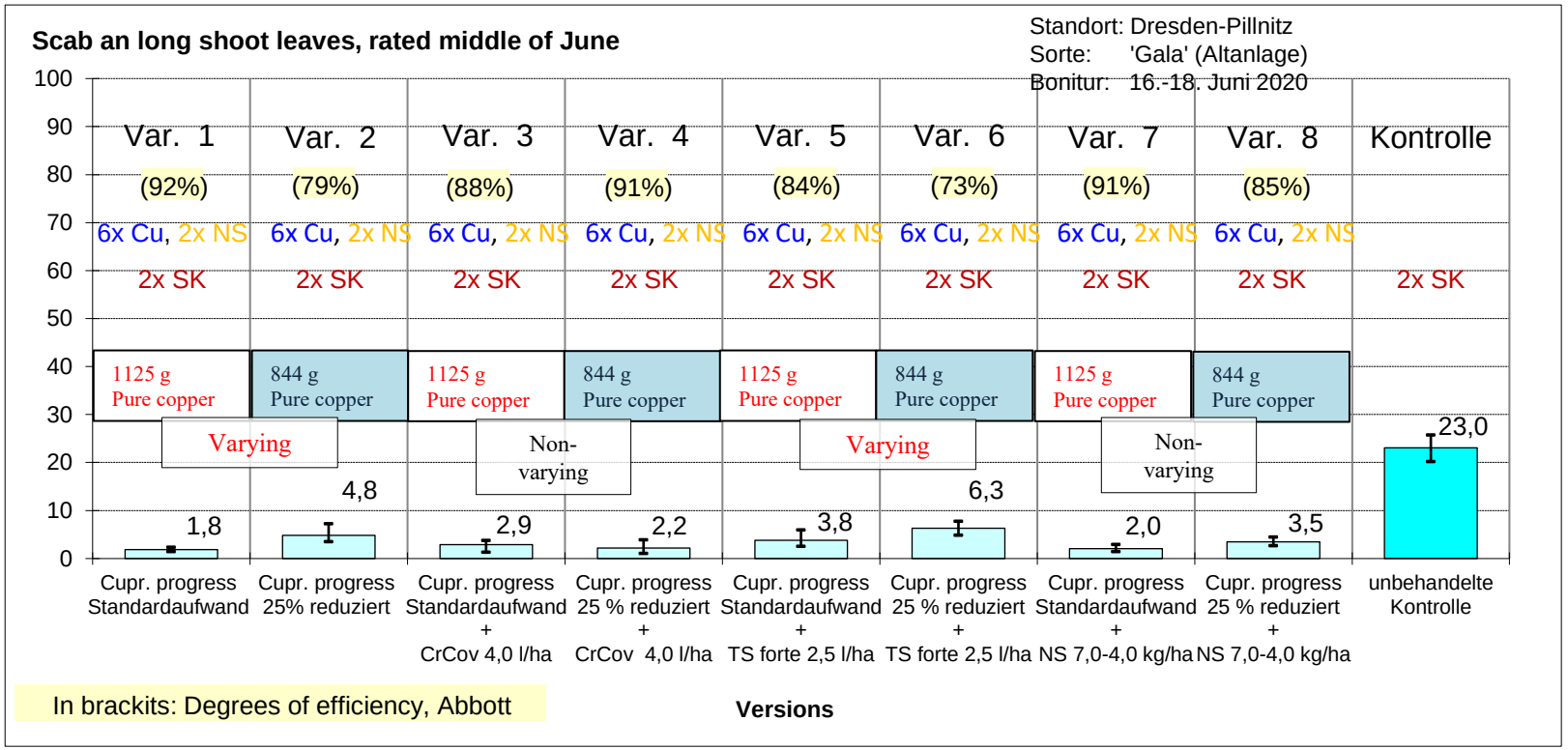

III. summary

- Used protectively ***Neu 1143F*** showed many a time promising results against scab, the good results of 2017 & 2018 were confirmed in 2019
- Even used up to 24 hrs after moment of germination ***Neu 1143F*** showed acceptable degrees of efficiency
- ***Neu 1143F*** also had a good impact in scab season 2021 with difficult conditions

  → ***Neu 1143F*** can play an important role reducing the use of copper

- *Different adhesive agents and surfactants were compared*

  → ***Several products showed (mostly slight) effects, but they can be an element of an integrated organic plant protection strategy***

Working Packages between 2017 – 2021:

Direct Regulation	Open Questions
Efficiency of new copper-free substances	On farm trials with NEU1143F. Necessary dose and amount of applications
Copper-free plant protection-strategies	Integration of NEU1143F in common strategy. Plant protection input in resilient systems with robust varieties
Hyperparasites, antagonistes	Accessibility of further antagonists/ hyperparasites
Copper reduction by using additives	+- clarified

Indirect regulation	Open Questions
Sanitary measures	Integration/ Kombination versch. Maßnahmen in die Praxis
Rain roof systems	Automatic systems, non-permanent systems, Agri-PV. Substitution oflastic.
Resistant varieties	Resilient systems (mixed variety orchards); Robustness against scab, but even against sooty blotch, Marssonina; market acceptance of new varieties
Effect of sulfur on leaf quality on Natyra	Appearently no simple direct correlation between amount of sulfur and appearance of leaf damages

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Thank for your patience.

And special thanks to the BLE for funding our project.

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