

New resistant varieties can enhance integrated management of Cercospora leaf spot in sugar beet

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Objective:

Comparison of a new type sugar beet variety (CR+) with improved resistance to Cercospora leaf spot (CLS) and a standard variety in:

- disease progression of CLS
- yield response under different fungicide strategies

Materials & Methods:

- 17 environments in Germany and Austria (2020-2021)
- completely randomized field trial (4 replications, 6-row plots)
- variety specific fungicide application timings (based on summary threshold system 5/15/45%)
- assessment of disease incidence and disease severity (DS)
- core harvested (3-rows)

Results:

Tab. 1: Disease severity (DS) of CLS at harvest and number of fungicide applications, two sugar beet varieties, 17 environments in Germany and Austria 2020-2021.

environment	year	DS of CLS at harvest (%)*		fungicide applications**	
		standard	CR+	standard	CR+
Hankensbüttel	2020	90	7	3	2
Frankenwinheim	2020	n. a.	n. a.	2	0
Seligenstadt	2020	11	0	2	0
Leeheim	2020	7	0	1	0
Steinweiler	2020	44	2	2	0
Schambach	2020	95	4	3	1
Makofen	2020	90	1	3	1
Trübensee (AT)	2020	100	70	4	2
Mailberg (AT)	2020	95	48	3	2
Hankensbüttel	2021	91	2	2	0
Einbeck	2021	100	2	4	2
Frankenwinheim	2021	32	1	2	0
Steinweiler	2021	91	10	2	0
Schambach	2021	69	3	3	1
Makofen	2021	95	6	3	1
Zwingendorf (AT)	2021	n. a.	n. a.	3	0
Trübensee (AT)	2021	n. a.	n. a.	3	1

n. a.: not assessed

*untreated control

**variety specific fungicide timing according to summary threshold system (disease incidence 5/15/45%)



Fig. 3: Trial at Trübensee (AT) end of September 2020
-1- standard / untreated, -2- standard / ST 5/15/45%, -3- CR+ untreated, -4- CR+ / ST 5/15/45%, -5- CR+ / treated like -2-

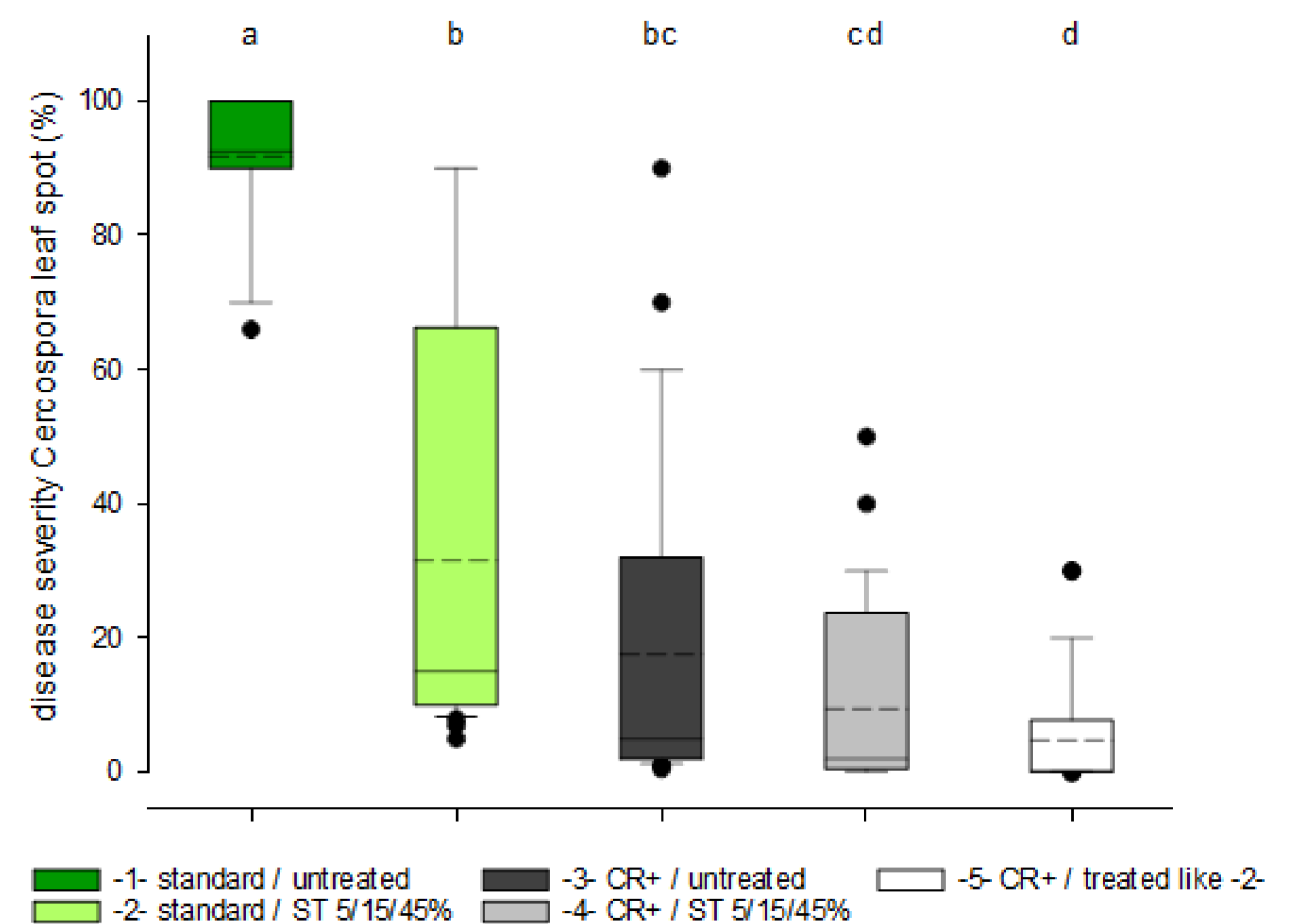


Fig. 1: Disease severity (%) of CLS at harvest, two sugar beet varieties in different fungicide strategies, mean of 8 environments in Germany and Austria 2020-2021 where both varieties reached summary threshold (ST 5/15/45%); different letters indicate significant differences (Tukey-test, $\alpha = 5\%$).

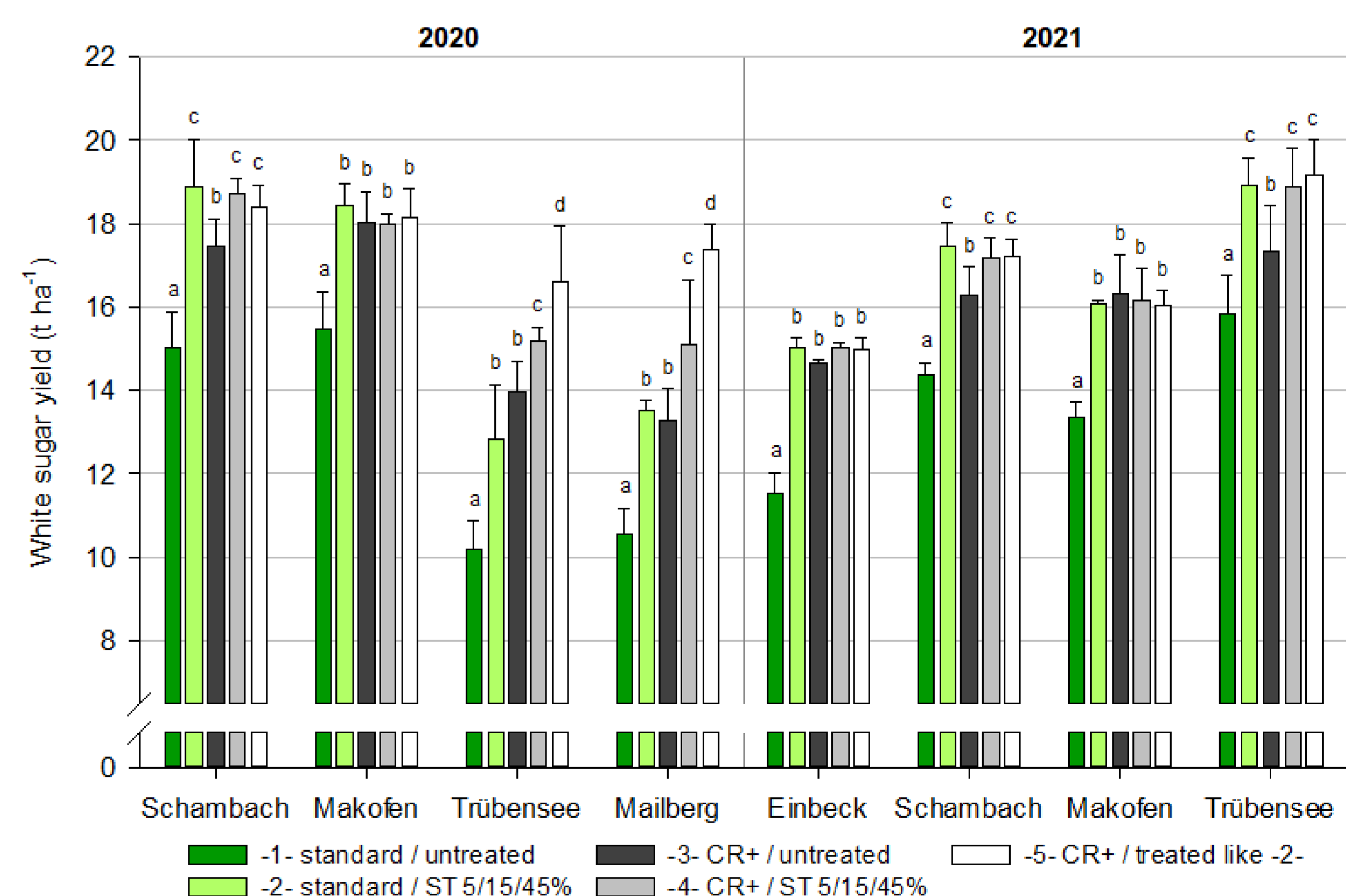


Fig. 2: White sugar yield ($t\ ha^{-1}$) of two sugar beet varieties in different fungicide application strategies, 8 environments in Germany and Austria 2020-2021 where both varieties reached summary threshold (ST 5/15/45%); different letters indicate significant differences between treatments within an environment (Tukey-test, $\alpha = 5\%$).

Conclusions:

- new varieties with improved resistance to CLS offer a potential to reduce fungicide applications based on the summary threshold system (depending on CLS pressure and occurrence of other leaf diseases)
- improved resistance to CLS reduces disease severity at harvest, lowest disease severity was achieved in combination with fungicide application → reduced inoculum potential
- yield effect of fungicide application depends on variety and disease pressure of CLS