EVOCA™

A new biofungicide for fruits and vegetables in Europe

October 2023

biotalys
reinventing food protection

evoca™

EVOCA™ is pending registration. This product is not currently registered for sale or use in the United States, the EU or elsewhere, and is not being offered for sale.

EVOCA™'s features and uses

(Label submission in EU)

Crops	Uses	Diseases	Stage of crop	Dose rate submitted for registration (Kg/ha)	Dose rate submitted for registration (A.S. g/ha)
Grape Vines	Field Outdoor	Botrytis *Botrytis cinerea*	Full flowering till harvest BBCH65 -BBCH89	5*	750
		Powdery mildew *Erysiphe necator*	BBCH15 -BBCH89	5*	750
Strawberries	Indoor Protected	Botrytis *Botrytis cinerea*	BBCH60 till harvest	5	750
		Powdery mildew *Podosphaera aphanis*	BBCH15 till harvest	5	750
Cucurbit		Powdery mildew *Erysiphe cichoracearum* and *Sphaerotheca fuliginea*	BBCH15 till harvest	5*	750
Tomato Fruiting vegetables of *Solanaceae*		Powdery mildew *Oidium neolycopersici* - *Erysiphe* spp. - *Leveillula taurica*/ *Oidiopsis taurica* *Sphaerotheca* spp	BBCH15 till harvest	5*	750

Maximum of applications per crop season : 5
Min. interval between applications : 5 to 10 days
*Corresponding with 2,5 kg/ha LWA.

Efficacy of EVOCA™ Botrytis and Powdery mildew in vine grapes

Results trials grapes Botrytis EU 2022

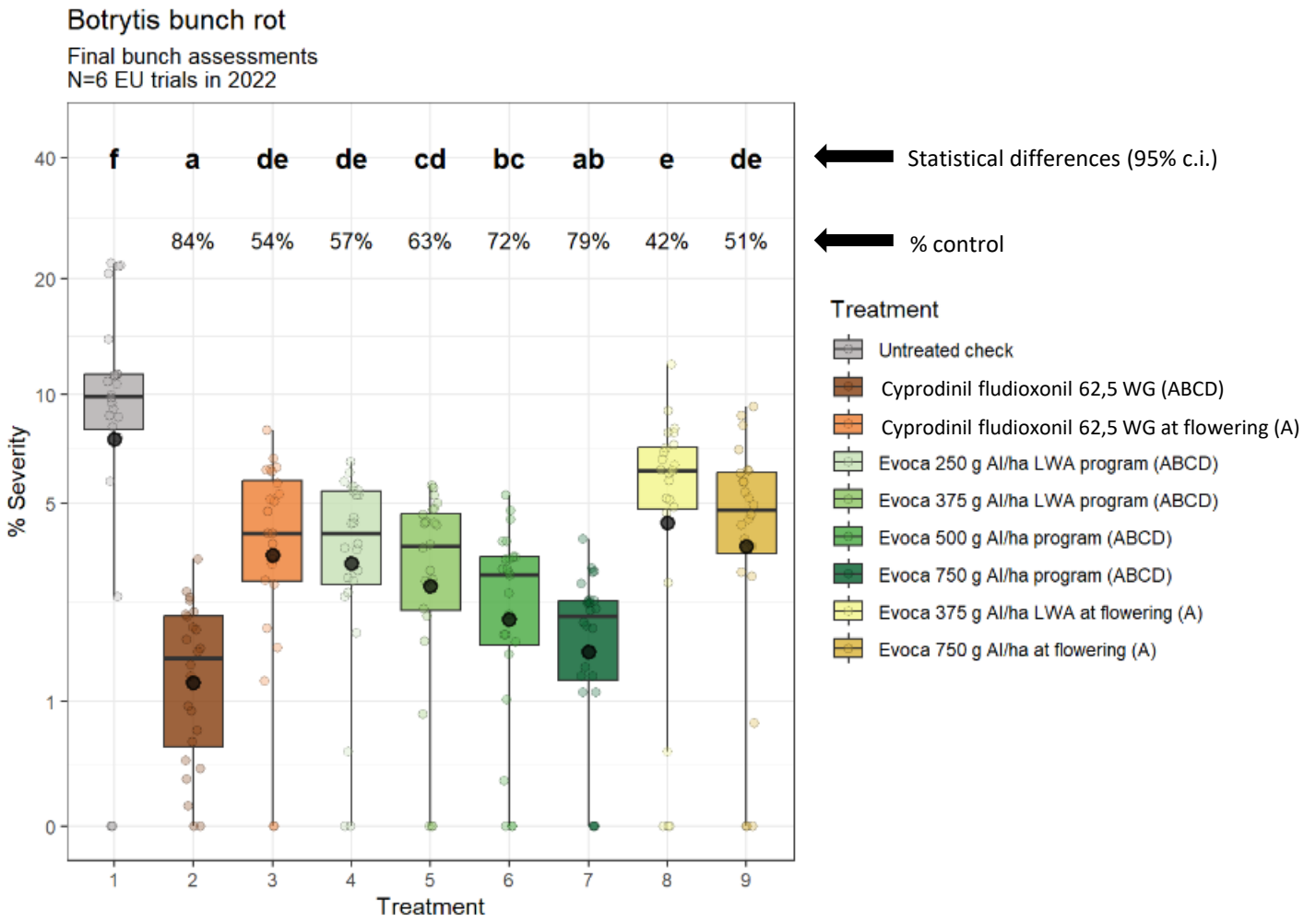
Objective: Efficacy of EVOCA™ at different rates and timings against Botrytis in grapevine using both LWA (leaf wall area) and a horizontal area approach




	Flowering	**Bunch closure**	**Veraison**	**Pre-harvest**
Program	A	B	C	D
	g ai/ha (spread))	g ai/ha (spread)	g ai/ha (spread)	g ai/ha (spread)
Untreated check	-	-	-	-
Cyprodinil fludioxonil 62,5 WG	500	500	500	500
Cyprodinil fludioxonil 62,5 WG	500			
EVOCA™ 250 g AI/ha LWA program	152 (117-283)	204 (150-273)	251 (220-280)	259 (220-283)
EVOCA™ 375 g AI/ha LWA program	228 (175-270)	306 (225-410)	377 (330-420)	389 (330-425)
EVOCA™ 500 g AI/ha program	500	500	500	500
EVOCA™ 750 g AI/ha program	750	750	750	750
EVOCA™ 375 g AI/ha LWA at flowering	228 (175-270)			
EVOCA™ 750 g AI/ha at flowering	750			

- Chemical reference is fludioxonil [FRAC G12] + cyprodinil [FRAC G9]
- 2022: 4 trials Italy, 2 trials Serbia
- Assessment of Botrytis bunch rot

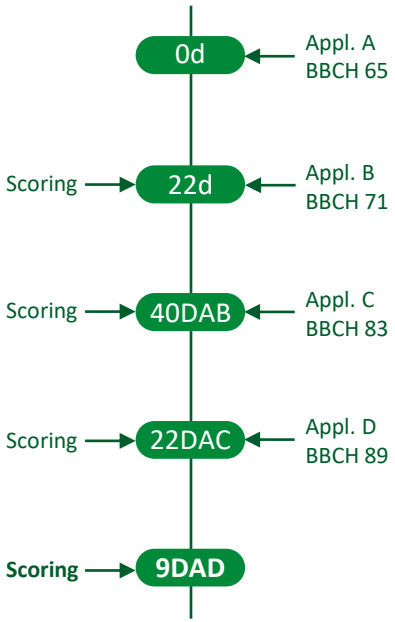
EVOCA™ is a robust biofungicide for the control of Botrytis bunch rot in grapes



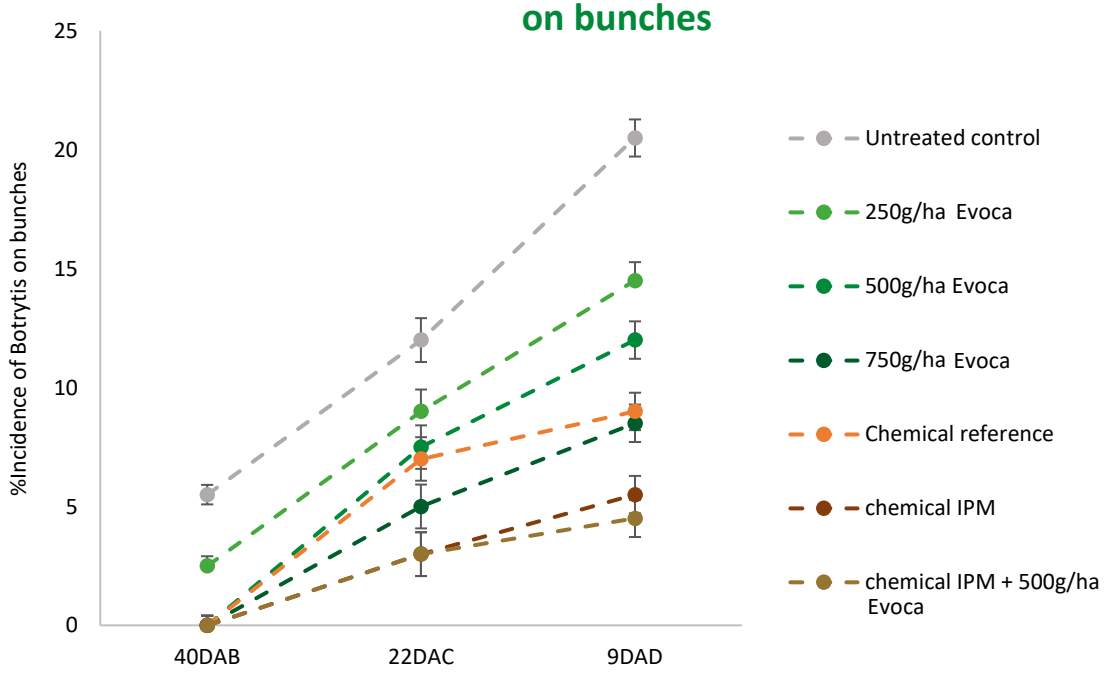
- Applied as a standalone in the GAP (submitted dose rate) EVOCA™ contributes to the control of Botrytis bunch rot, starting from flowering application.
- Adding applications of EVOCA™ at bunch closure, veraison and harvest brings a disease control to 79 %, which is similar to the chemical standalone application of the chemical reference

Effect of EVOCA™ on
Botrytis cinerea on grape bunches

- **IPM program** with rotation of 500g/ha **EVOCA™** provides **on par activity with chemical IPM**
- **Clear dose response** of **EVOCA™** with significant performance of all rates compared to the Untreated Control



Evolution of percentage incidence of *Botrytis cinerea* on bunches



Untreated

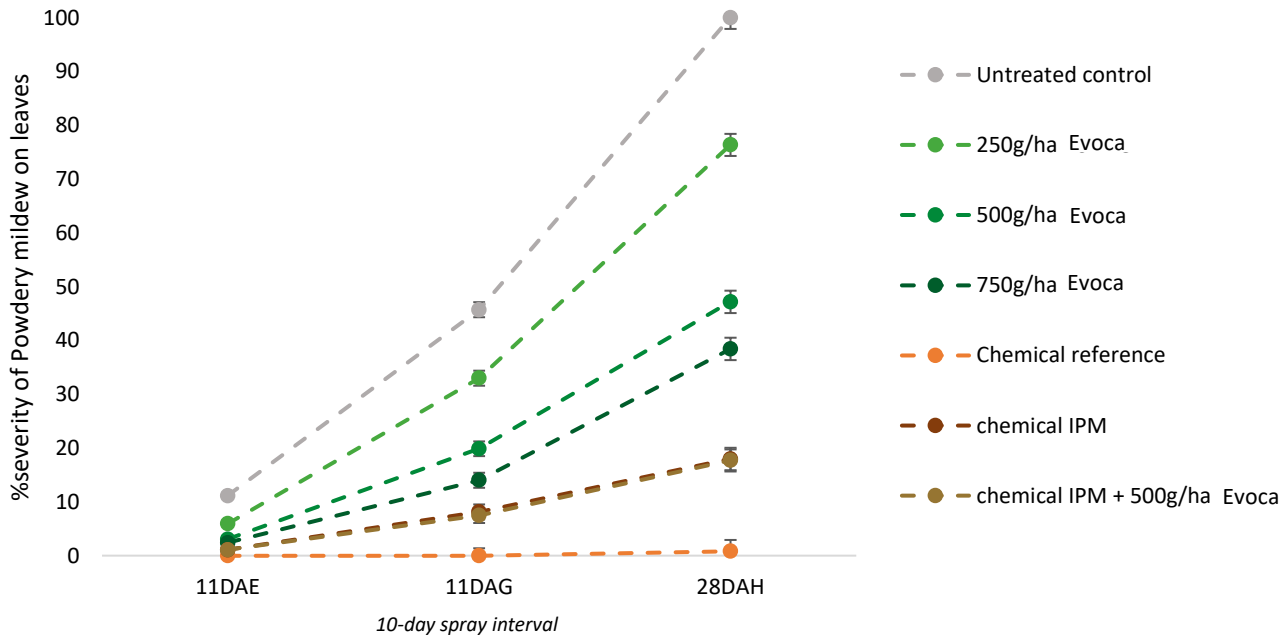
Evoca™

Source: Biotalys field trial 2019 - FR, Rhones-Alpes area, Saint-Savin

Effect of EVOCA™ on
Powdery mildew on grape bunches

- **EVOCA™** at 750g a.i /ha provides Powdery mildew control **on par with chemical treatment under low and moderate disease pressure.**
- **Clear dose response**, with **all rates** providing **significant control** compared with the untreated check, **even under very important disease pressure**.

Percentage Powdery mildew severity on leaves



Source: Biotalys field trial 2019 - EU, IT, Mornico Losana – Casamadama 2019-EU-IT-GRAPE-11
Source: Biotalys field trial 2019 - FR, Rhones-Alpes area, Saint-Savin

Untreated

Evoca™

Efficacy of EVOCA™ Powdery mildew cucumber

2022 EU cucumber

Powdery mildew protocol setup

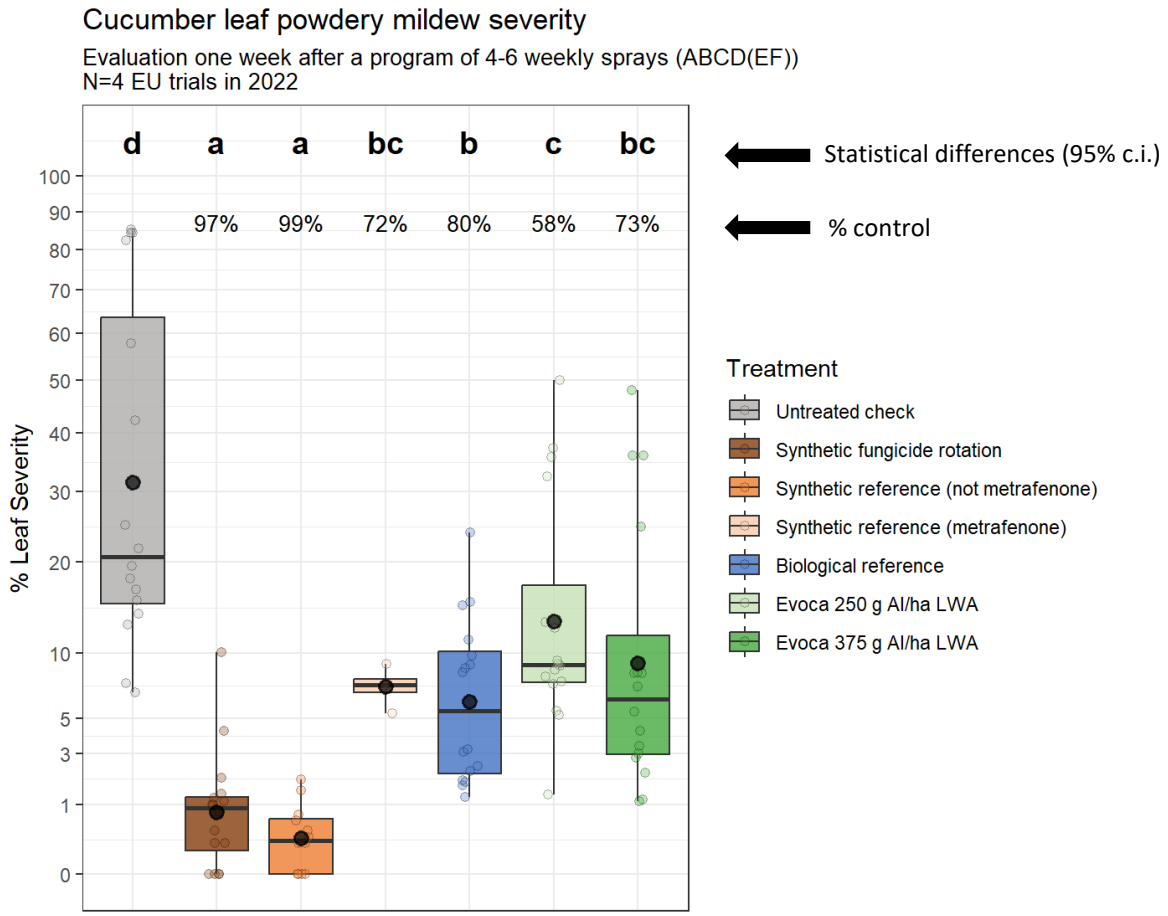
Program	A= Preventive	B	C	D	E**	F*
	g ai/ha***	g ai/ha***	g ai/ha***	g ai/ha***	g ai/ha***	g ai/ha
Untreated check	-	-	-	-		
Synthetic fungicide rotation	• AB sulfur/ C bupirimate/ DE dimethomorph+pyraclostrobin (1/4trials) • ACE difenoconazole+fluxapyroxad / BD penconazole (1/4 trials) • AC difenoconazole+fluxapyroxad / BD penconazole (1/4 trials) • AD myclobutanil/ BE penconazole / C boscalid+pyraclostrobin (1/4 trials)					
Synthetic reference	• ABCD(E) difenoconazole+fluxapyroxad (2/4 trials)** • ABCDE metrafenone (1/4 trials) • ABCDE penconazole (1/4 trials)					penconazole
Biological reference	• ABCD(E) *Bacillus pumilus (3/4 trials)*** • ABCDE *potassium hydrogen carbonate (1/4 trials)*					*potassium hydrogen carbonate*
EVOCA™ 250 g AI/ha LWA	361	380	405	423	422	266
EVOCA™ 375 g AI/ha LWA	540	568	605	634	632	397

Trials; 2022F0102PODOXA_CUMSA-EF1G-AG1EUIT1, -ST2EUES1, ST2EUES2, -SK1EUBE1
* The trial in Belgium received 6 sprays ABCDEF except the fungicide synthetic rotation
** One trial in Spain received 4 sprays ABCD
*** Average g ai /ha over all 4 trials

- Locations: 1 Italy; 2 Spain; 1 Belgium
- 5 (4-6*) applications based on a weekly interval, starting preventative

2022 EU cucumber

Powdery mildew stand-alone Evoca™ efficacy



- Valid trials as evidenced by the sufficient infection and performance of the chemical reference in the stand-alone and rotation program.
- EVOCA™ performance for the proposed regulatory rate (375 g ai/ha LWA) reaches 73% disease control, comparable to the level of Powdery mildew control provided by the biological references
- No phytotoxicity

Trials: 2022F0102PODOXA_CUMSA-EF1G-AG1EUIT1, -ST2EUES1, -ST2EUES2, -ST2EUBE1

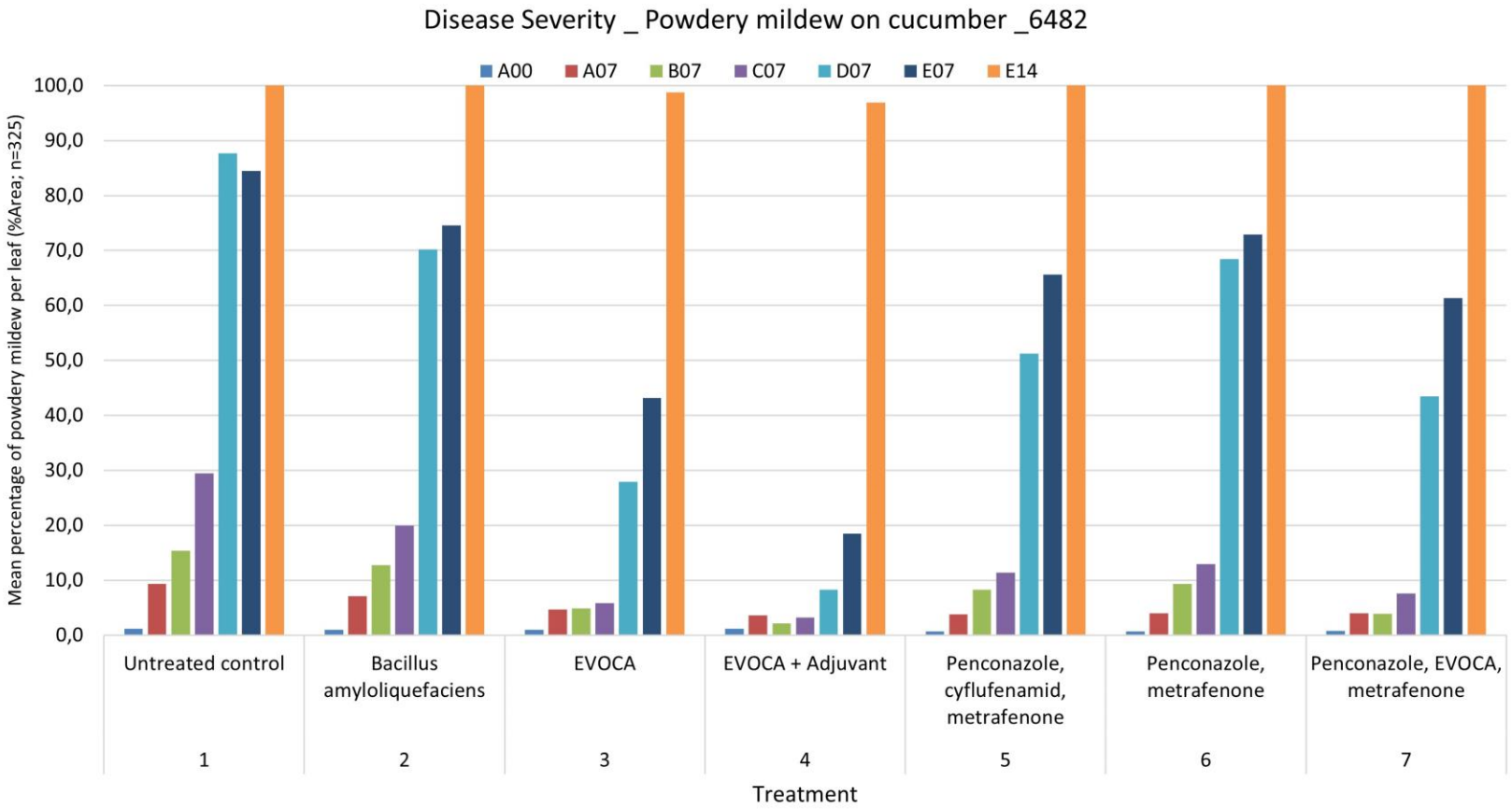
Efficacy of EVOCA™ on

Powdery mildew cucumber protocol setup

Table 2.1: Treatment list; products, rates and application timings

Treatment				other rate		Appl.
	Product	Dose	Unit	Dose	Unit	Code
1	Untreated control					
2	*Bacillus amyloliquefaciens*	8,00	l/ha			ABCDE
3	EVOCA	2,47	kg/ha lwa		375 g ai / ha lwa	ABCDE
4	EVOCA	2,47	kg/ha lwa		375 g ai / ha lwa	ABCDE
4	ELASTO G5 (Adjuvant)	250,00	ml/100L			ABCDE
5	Penconazole	50,00	ml/100L			A
5	Cyflufenamid	0,15	l/ha			BD
5	Metrafenone	10,00	ml/100L			CE
6	Penconazole	50,00	ml/100L			A
6	Metrafenone	10,00	ml/100L			CE
7	Penconazole	50,00	ml/100L			A
7	EVOCA	2,47	kg/ha lwa		375 g ai / ha lwa	BD
7	Metrafenone	10,00	ml/100L			CE

Efficacy of EVOCA™ on
Powdery mildew cucumber



- High disease pressure at the end of the trial
- Evoca (stand alone + adjuvant) showed the best efficacy.
- Evoca stand alone better then biological reference and chemical program
- Added value of Evoca in IPM compared to *gap* program
- No phytotoxicity

Botany reported some increased level of resistance built up against metrafenon as frequently used as reference chemical.

Efficacy of EVOCA™ on

Powdery mildew cucumber

Efficacy of EVOCA™ on Powdery mildew in tomato

2022 EU tomato

Powdery mildew protocol setup

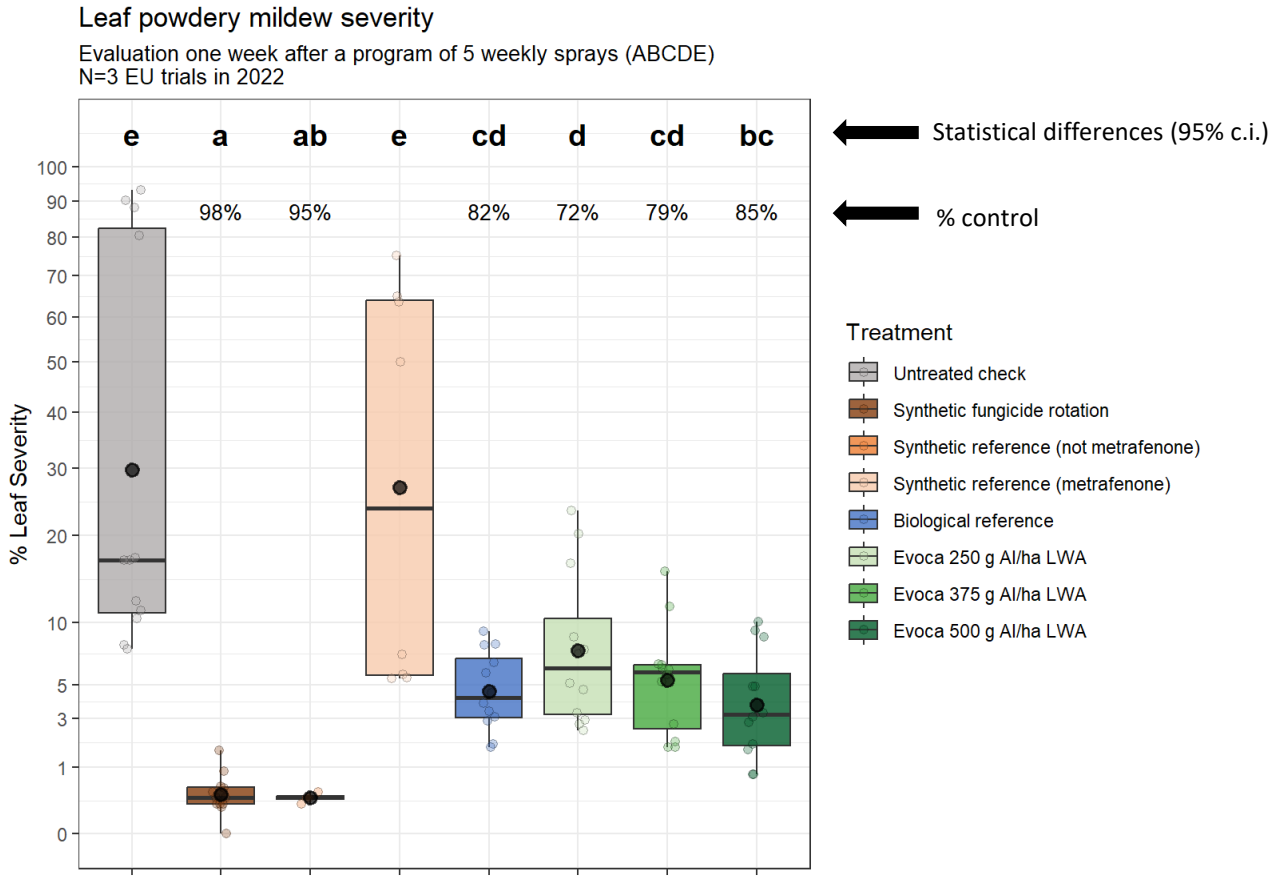
Program	A= Preventive	B	C	D	E
	g ai/ha (spread)	g ai/ha (spread)	g ai/ha (spread)	g ai/ha (spread)	g ai/ha (spread)
Untreated check	-	-	-	-	
Synthetic fungicide rotation	2xsulfur/ bupirimate/ 2xdifenoconazole+fluxapyroxad (1/3trials) 2xmetrafenone/ azoxystrobin/ penconazole/ boscalid+pyraclostrobin (1/trials) 2xdifenoconazole+fluxapyroxad/ 2xpenconazole (1/3 trials)				
Synthetic reference	5x difenoconazole+fluxapyroxad (1/3 trials) 5x metrafenone (2/3 trials)				
Biological reference	*Bacillus pumilus**	*Bacillus pumilus**	*Bacillus pumilus**	*Bacillus pumilus**	*Bacillus pumilus**
EVOCA™ 250 g AI/ha LWA	375 (250-500)	392 (300-500)	414 (374-500)	442 (375-500)	458 (375-500)
EVOCA™ 375 g AI/ha LWA	542 (375-750)	567 (450-750)	604 (500-750)	642(500-750)	667(500-750)
EVOCA™ 500 g AI/ha LWA	625 (500-750)	675 (600-750)	750 (750-750)	750	750

Trials; 2022F0102OIDINL_LYPXP-EF1G-AG1EUIT1, -BT1EUNL1, -ST2EUES2
*= adjuvant Elasto 5G was added to *Bacillus pumilus* in Netherlands

- Objective: Efficacy of EVOCA™ at different rates against Powdery mildew in tomato against a full synthetic rotation, a stand alone synthetic reference and a biological reference
- 2022: trials in Italy, Spain and Netherlands

2022 EU tomato

Powdery mildew stand-alone Evoca™ efficacy



- Valid trials thanks to sufficient infection and performance of chemical reference stand alone program. Slight dose rate effect.
- EVOCA™ performance for the proposed regulatory rate (375 g ai/ha LWA) reaches 79% disease control, which is on par with the level of Powdery mildew control provided by the biological reference *Bacillus pumilus*
- In comparison against the synthetic reference as a stand alone, EVOCA™ outperforms metrafenone, but can not meet the combo of difenoconazole + fluxapyroxad
- No phytotoxicity

Trials; 2022F0102OIDINL_LYPXP-EF1G-AG1EUIT1, -BT1EUNL1, -ST2EUES2

Efficacy of EVOCA™ on
Powdery mildew tomato protocol setup

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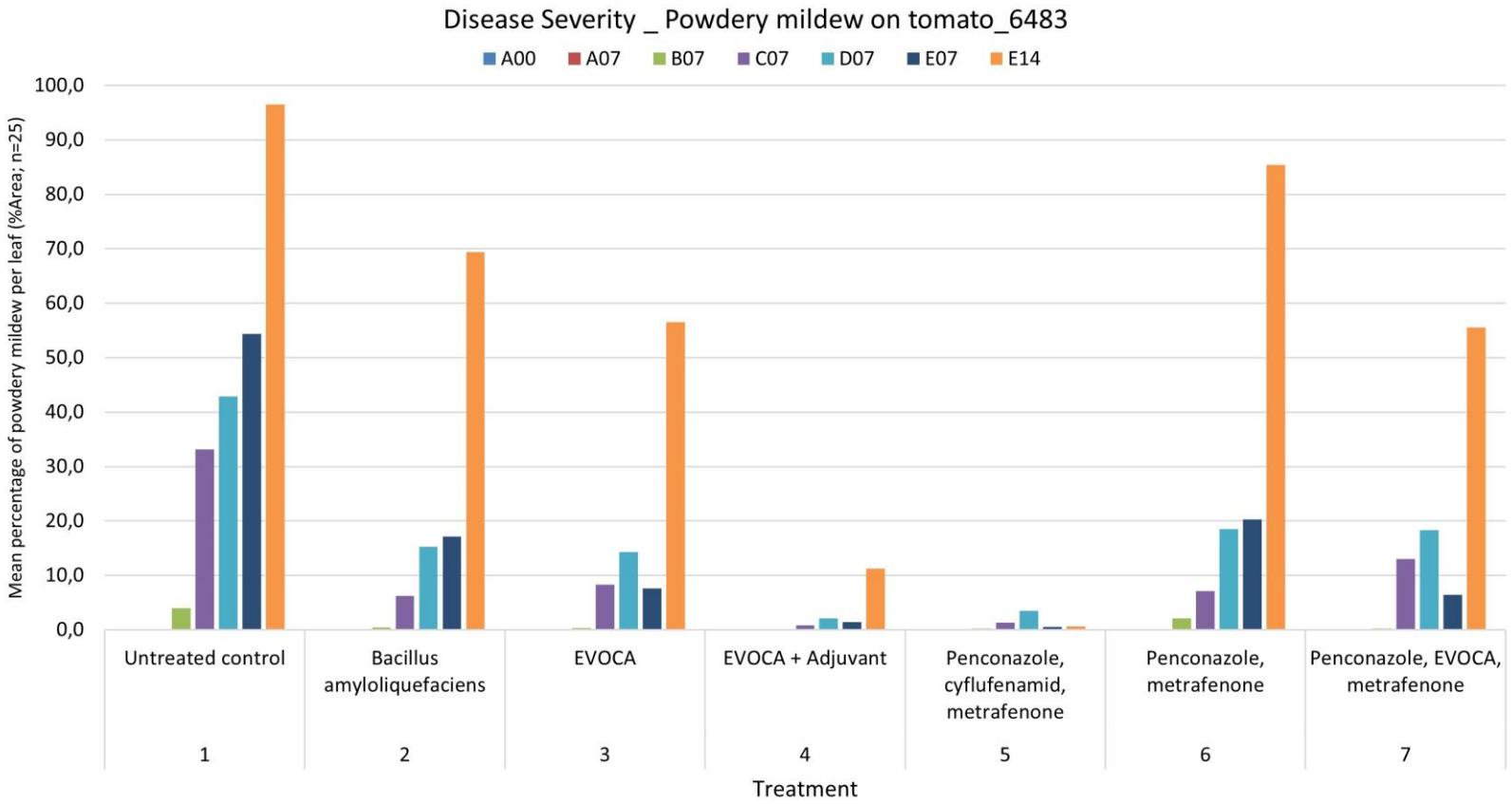
Efficacy of EVOCA™ on
Powdery mildew tomato



- High disease pressure in the trial
- Evoca (stand alone + adjuvant) and full chemical program showed the best efficacy
- Evoca solo comparable with biological reference
- Added value of Evoca in IPM compared to *gap* program
- No phytotoxicity

Botany reported some increased level of resistance built up against metrafenon as frequently used as reference chemical.

Efficacy of EVOCA™ on

Powdery mildew tomato

Evoca™: a novel tool for biocontrol

Effective rotation product as demonstrated in global field trial program[1]

New mode-of-action for resistance management: replacement of conventional chemicals in IPM

Convenience, storability and reliability of traditional chemicals (formulated as water soluble granules)

Regulatory review ongoing in the USA and EU

Contact activity for preventive control of *Botrytis cinerea* and powdery mildew

Supports residue reduction in rotation programs[1]

Designed to be safe for workers, consumers & the environment

Introduction crops:
Vines and high-value fruit & vegetables

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1. Biotalys data

biotalys
reinventing food protection

evoca™

Biotalys NV
Buchtenstraat 11, B-9051 Gent, Belgium

Biotalys, Inc.
8480 Honeycutt Road Suite 215 Raleigh NC
27651 - USA

Phone: +32 9 274 54 00
info@biotalys.com