

A21-013-890FE

Efficacy of ozone applied alone and in mix, against Erysiphe necator on grape. Italy 2021

Trial ID: A21-013-890FE Location: Italy Trial Year: 2021
Protocol ID: 890A21FE10 Investigator (Creator): Sergio Spitaleri
Project ID: Study Director: Antonio Russo
Official Trial ID: A21-013-890FE Sponsor Contact: Federico Ponti
Trial Origin: C contracted trial

TREATMENT LIST

Trt No.	Type	Treatment Name	Form Conc	Form Unit	Form Type	Description	Rate	Rate Unit	Appl Code	Comment 1	Comment 2
1	CHK	Untreated Check									
2	FUNG	Ozone			SN		5ppm pr		ABCDEFGHIJ	500-1200 L/ha	Spray application with water
3	FUNG	Zolfis 80 Sector	80%		WG		6kg/ha		ABCDEFGHIJ	500-1200 L/ha	Spray application
4	FUNG	Ozone			SN		5ppm pr		ABCDEFGHIJ	500-1200 L/ha	Apply Zolfis 80 Sector after after Ozone on dry leaves
	FUNG	Zolfis 80 Sector	80%		WG		6kg/ha		ABCDEFGHIJ	500-1200 L/ha	
5	FUNG	Ozone			SN		5ppm pr		ABCDEFGHIJ	500-1200 L/ha	Ozone spray application in emulsified sunflower oil with water
	FUNG	Sunflower oil			EC	Rate 1-5 %V/V	1% v/v		ABCDEFGHIJ	500-1200 L/ha	
6	FUNG	Sunflower oil			EC	Rate 1-5 %V/V	1% v/v		ABCDEFGHIJ	500-1200 L/ha	Spray application

OBJECTIVES

Objectives:

- Do the Ozone used alone have efficacy comparable to the standard Zolfis 80 Sector?
- Does the addition of Ozone to the standard Zolfis 80 Sector increase the efficacy of Zolfis 80 Sector used alone?
- Does the addition of Ozone emulsified Sunflower oil increase the efficacy of Ozone used alone?
- Are all treatments safe for the crop?

SITE DESCRIPTION

Trial Location			
City:	MASSA LOMBARDA	Country:	ITA Italy
State/Prov.:	Ravenna RA	Region:	ER
Postal Code:	48024	Climate Zone:	EPOMED EPPO Mediterranean

Crop Description			
Crop 1:	C VITVI Vitis vinifera	European Grape	BBCH Scale: BGRA
Entry Date:	Sep-30-2021	Stage Scale:	BBCH
Variety:	Trebbiano Romagnolo	Planting Rate:	10 P/PLOT
Perennial Age:	17 YR	Planting Density:	2604 P/ha
Rows per Plot:	1	Planting Method:	TRAMAC transplanted - machine
Row Spacing:	3,2 m	Planting Equipment:	MT transplanter, mechanical
Spacing within Row:	1,2 m	Soil Moisture:	GOOD good
		Plant Arrangement:	ROW

Pest Description		
Pest 1 Type: D	Code: UNCINE	Erysiphe necator
Common Name:	Powdery mildew of grapevine	Stage Scale: BBCH

Site and Design			
Treated Plot Width:	3,2 m	Total Plot Width:	3,2 m
Treated Plot Length:	12 m	Total Plot Length:	12 m
Treated Plot Area:	38,4 m ²	Treatments:	6
Replications:	4	Site Type:	FIELD field
% Slope:	0	Experimental Unit:	1 PLOT plot
Untreated Arrangement:	INCLUDED	Tillage Type:	CONTIL conventional-till
Block Arrangement:	BSSPSS	Study Design:	RACOBL Randomized Complete Block (RCB)
			single control randomized in each block
			all blocks side by side, plots side by side

Soil Description			
% Sand:	52	% OM:	1
% Silt:	29	pH:	7,8
% Clay:	19	Texture:	L loam
Soil Drainage:	G good	Soil Name:	LOAM
		Fert. Level:	G good

Application Description							
	A	B	C	D	E	F	G
Application Date	May-4-2021	May-11-2021	May-21-2021	May-28-2021	Jun-5-2021	Jun-15-2021	Jun-24-2021
Appl. Start Time	12:00	10:00	15:00	16:00	10:00	15:00	12:00
Appl. Stop Time	13:00	11:00	16:00	17:00	11:00	16:00	13:00
Interval to Prev. Appl.		7 DAYS	10 DAYS	7 DAYS	8 DAYS	10 DAYS	9 DAYS
Application Method	BROADC	BROADC	BROADC	BROADC	BROADC	BROADC	BROADC
Application Timing	PRAPSY	FIINSP	FIINSP	FIINSP	FIINSP	FIINSP	FIINSP
Application Placement	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR
Applied By	Spitaleri	Spitaleri	Spitaleri	Spitaleri	Spitaleri	Spitaleri	Spitaleri
Appl. Entry Date	Sep-30-2021	Sep-30-2021	Sep-30-2021	Sep-30-2021	Sep-30-2021	Sep-30-2021	Sep-30-2021
Air Temperature Start, Stop	18; 18 C	20; 20 C	21; 21 C	23; 23 C	20; 20 C	24; 24 C	27; 27 C
% Relative Humidity Start, Stop	56; 56	48; 48	50; 50	38; 38	45; 45	67; 67	41; 41
Wind Velocity+Dir. Start	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -
Wind Velocity+Dir. Stop	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -
Wind Velocity+Dir. Max	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -	0 MPS; -
Wet Leaves (Y/N)	N; no	N; no	N; no	N; no	N; no	N; no	N; no
Soil Temperature	17 C	19 C	19 C	19 C	18 C	20 C	21 C
Soil Moisture	SLIDRY	DRY	DRY	DRY	DRY	DRY	DRY
Soil Surface Condition	FINE	FINE	FINE	FINE	FINE	FINE	FINE
% Cloud Cover	0	0	10	20	0	40	0
Next Moisture Occurred On	May-11-2021	May-14-2021	May-24-2021	May-29-2021	Jun-6-2021	Jul-13-2021	Jul-13-2021
Time to Next Moisture	7,0 DAY	3,0 DAY	3,0 DAY	1,0 DAY	1,0 DAY	28,0 DAY	19,0 DAY
Moisture 6 Hours after Appl.	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm	0 mm
Moisture 1 Week after Appl.	0,6 mm	1,8 mm	15,8 mm	0,2 mm	29 mm	0 mm	0 mm
Weather Source	WSLOCAL	WSLOCAL	WSLOCAL	WSLOCAL	WSLOCAL	WSLOCAL	WSLOCAL
	H	I	J				
Application Date	Jul-2-2021	Jul-12-2021	Jul-19-2021				
Appl. Start Time	16:00	9:00	12:00				
Appl. Stop Time	17:00	10:00	13:00				
Interval to Prev. Appl.	8 DAYS	10 DAYS	7 DAYS				
Application Method	BROADC	BROADC	BROADC				
Application Timing	FIINSP	FIINSP	FIINSP				
Application Placement	FOLIAR	FOLIAR	FOLIAR				
Applied By	Spitaleri	Spitaleri	Spitaleri				
Appl. Entry Date	Sep-30-2021	Sep-30-2021	Sep-30-2021				

Air Temperature Start, Stop	30; 30 C	28; 28 C	30; 30 C
% Relative Humidity Start, Stop	38; 38	45; 39	39; 39
Wind Velocity+Dir. Start	0 MPS; -	0 MPS; -	0 MPS; -
Wind Velocity+Dir. Stop	0 MPS; -	0 MPS; -	0 MPS; -
Wind Velocity+Dir. Max	0 MPS; -	0 MPS; -	0 MPS; -
Wet Leaves (Y/N)	N; no	N; no	N; no
Soil Temperature	22 C	19 C	22 C
Soil Moisture	DRY	DRY	DRY
Soil Surface Condition	FINE	FINE	FINE
% Cloud Cover	0	30	0
Next Moisture Occurred On	Jul-13-2021	Jul-13-2021	Jul-27-2021
Time to Next Moisture	11,0 DAY	1,0 DAY	8,0 DAY
Moisture 6 Hours after Appl.	0 mm	0 mm	0 mm
Moisture 1 Week after Appl.	0 mm	23,4 mm	1,2 mm
Weather Source	WSLOCAL	WSLOCAL	WSLOCAL

Comment:

In trt. 3 , trt. 4, trt. 5 and trt. 6 the standard product was applied by means of knapsack sprayer #188.

Operation pressure: 5 BAR

Nozzle Type: Hollow Cone

Nozzle size: 02

Nozzle spacing: 7 cm

Nozzle/Row: 3

Nozzle calibration: 3620 mL/MIN

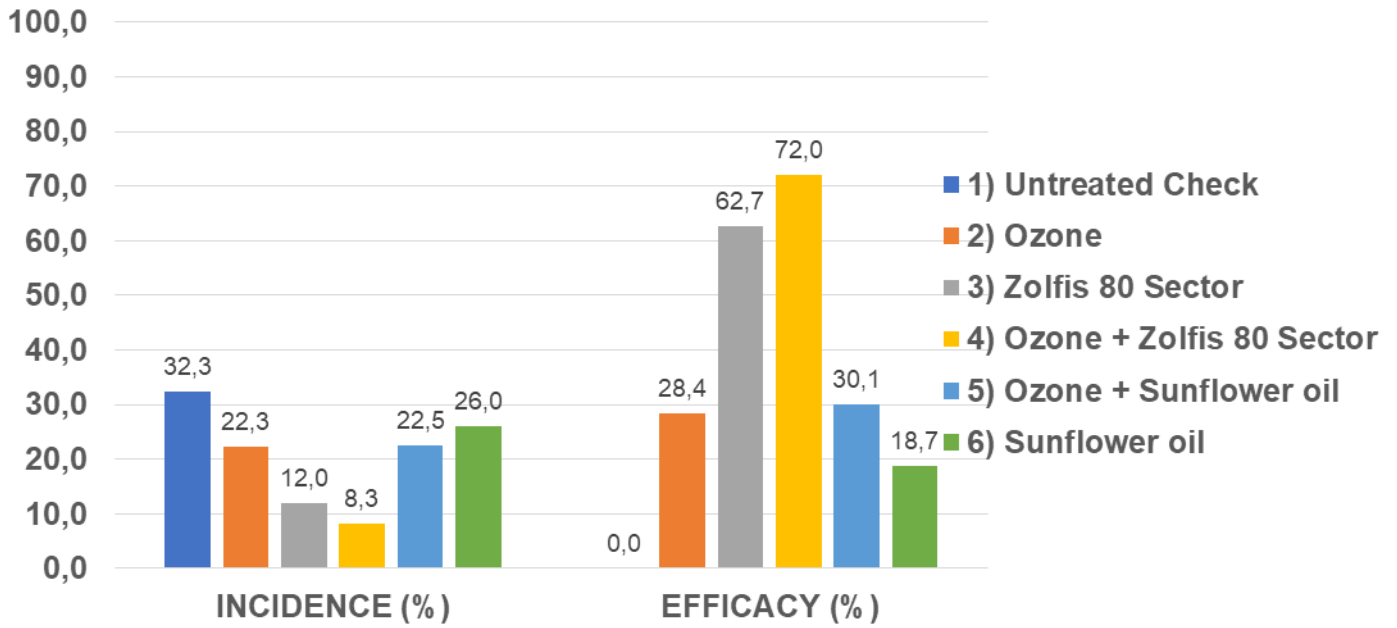
Time of application:

- Appl. A: 31.8
- Appl. B: 38.2
- Appl. C: 44.6
- Appl. D: 50.9
- Appl. E: 57.3
- Appl. F: 63.7
- Appl. G: 63.7
- Appl. H: 63.7
- Appl. I: 63.7
- Appl. J: 63.7

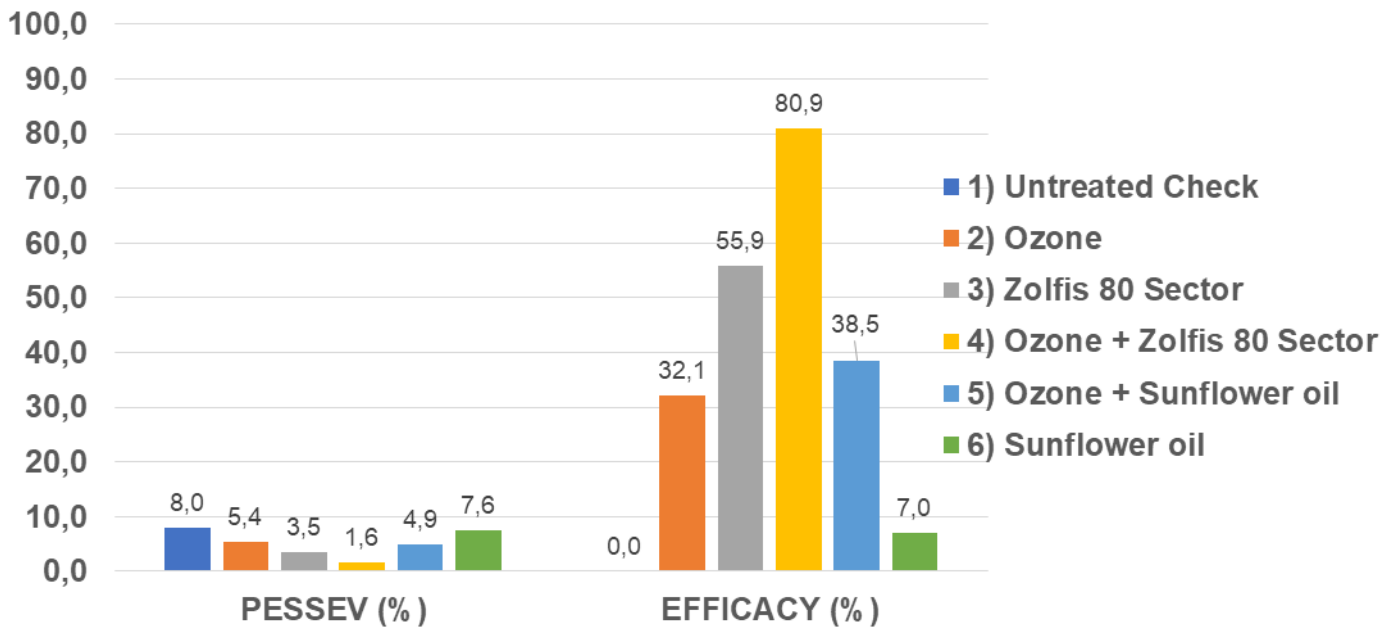
<p>·</p> <p>· Protocol Application Directions:</p> <p>·</p> <p>· Time and frequency of application</p> <p>· Start applications when conditions for the disease occur and applicate before the primary infections.</p> <p>· Interval between applications: 7-10 days</p> <p>·</p> <p>·</p> <p>·</p> <p>· Doses and volumes</p> <p>· Use water volume variable following crop growth: 500-1200 L/ha</p> <p>·</p>

RESULTS

Incidence on bunches – 14 days after last application



Severity on bunches – 14 days after last application



COMMENTS

English version: At the end of the experimental program for the control of *Erysiphe necator* on grape, during which 10 applications were carried out based on susceptibility moments of the crop, the untreated check showed a disease severity on bunches equal to 8.01% with an incidence equal to 32.3%. All the products tested in field showed significant results if compared to the untreated check regarding the pest severity and pest incidence. The best result on bunches, was showed by the reference product Zolfis 80 Sector applied in strategy with Ozone with 72.0% of control comparable to the standard Zolfis 80 Sector applied alone that showed 62.7% of efficacy. Different from the previous ones, Ozone applied alone, with 28.4% of control was comparable to the strategy of Ozone with emulsified Sunflower oil (with 30.1%). The addition of Ozone increase the efficacy of Zolfis 80 Sector although not statistically significant. The addition of Ozone emulsified Sunflower oil, do not increase the efficacy of Ozone applied alone.

Versione italiana: Al termine della strategia sperimentale per il controllo di *Erysiphe necator* su vite, durante la quale sono state realizzate 10 applicazioni, basate sui momenti di suscettibilità della coltura, il testimone non trattato ha mostrato una severità della malattia sui grappoli pari al 8.01% con una incidenza pari al 32.3%. Tutti i prodotti applicati in campo hanno fornito risultati significativi rispetto al testimone per quanto riguarda la severità e l'incidenza della malattia. Il miglior risultato sui grappoli è stato fornito dal prodotto di riferimento Zolfis 80 Sector applicato in strategia con Ozono con il 72.0% di controllo comparabile allo standard Zolfis 80 Sector applicato da solo con il 62.7% di efficacia. Differente dai precedenti, Ozono applicato da solo, con il 28.4% di controllo, era comparabile con la strategia di Ozono con Sunflower oil emulsionato (con 30.1%). L'aggiunta di Ozono incrementa l'efficacia di Serenade ASO sebbene non sia statisticamente significativa. L'aggiunta di Ozono emulsionato con Sunflower oil, non aumenta l'efficacia di Ozono applicato da solo.

CONCLUSION

Conclusions:

English version: Within the test aimed at controlling *Erysiphe necator* on grape with the use of organic products, Ozone alone showed efficacy in reducing the disease severity and incidence on bunches compared to the untreated check. Ozone in strategy with the standard Zolfis 80 Sector showed the best control of the disease comparable to the standard applied alone. No symptoms of phytotoxicity were observed.

Versione italiana: All'interno della prova volta al controllo di *Erysiphe necator* su vite con utilizzo di prodotti biologici, l'Ozono da solo ha mostrato efficacia nel ridurre la severità e l'incidenza della malattia sui grappoli rispetto al non trattato. Ozono in strategia con lo standard Zolfis 80 Sector ha mostrato il miglior controllo della malattia comparabile allo standard applicato da solo. Non si sono osservati sintomi di fitotossicità.

CONTACTS

Renzo Bucchi

Scientific Responsible
Agri 2000 Net Srl
www.agri2000net.com
bucchi@agri2000.it