

A21-014-890FE

Efficacy of ozone applied alone and in mix, against Botrytis spp. on Blackberry. Italy, Spain and Morocco 2020-2021

Trial ID: A21-014-890FE Location: Italy Trial Year: 2021
Protocol ID: 890A20FE7 Investigator (Creator): Matteo Freddi
Project ID: Study Director: Antonio Russo
Official Trial ID: A21-014-890FE Sponsor Contact: Federico Ponti
Trial Origin: C contracted trial

TREATMENT LIST

| Trt No. | Type | Treatment Name | Form Conc | Form Unit | Form Type | Description | Other Rate | Other Rate Unit | Appl Code | Comment 1 | Comment 2 |
|---------|------|-----------------|-----------|-----------|-----------|-------------|------------|-----------------|-----------|---------------|--|
| 1 | CHK | Untreated Check | | | | not treated | | | | | |
| 2 | FUNG | Ozone | | | SN | | 3ppm pr | | ABCDE | 500-1500 L/ha | Spray application with water |
| 3 | FUNG | Serenade ASO | 14,1 | g/L | SC | | 8l/ha | | ABCDE | 500-1500 L/ha | Spray application |
| 4 | FUNG | Ozone | | | SN | | 3ppm pr | | ABCDE | 500-1500 L/ha | Spray application with water |
| | FUNG | Serenade ASO | 14,1 | g/L | SC | | 8l/ha | | ABCDE | 500-1500 L/ha | Apply Serenade ASO after Ozone on dry leaves |
| 5 | FUNG | Ozone | | | SN | | 3ppm pr | | ABCDE | 500-1500 L/ha | Ozone spray application in emulsified |
| | FUNG | Sunflower oil | | | EC | | 1% v/v | | ABCDE | 500-1500 L/ha | sunflower oil with water |
| 6 | FUNG | Sunflower oil | | | EC | | 1% v/v | | ABCDE | 500-1500 L/ha | |

OBJECTIVES

Objectives:

- Do the Ozone used alone have efficacy comparable to the standard Serenade ASO?
- Does the addition of Ozone to the standard Serenade ASO increase the efficacy of Serenade ASO used alone?
- Does the addition of Ozone emulsified Sunflower oil increase the efficacy of Ozone used alone?
- What is the efficacy of Sunflower oil alone?
- Are all treatments safe for the crop?

SITE DESCRIPTION

| Trial Location | | | |
|---------------------|------------|----------------------|--------------------------|
| City: | Mezzolara | Country: | ITA Italy |
| State/Prov.: | Bologna BO | Region: | Emilia R. |
| Postal Code: | 40054 | Climate Zone: | EPOMED EPO Mediterranean |

| Crop Description | | | |
|----------------------------|-----------------------------|--------------------------|-------------------------|
| Crop 1: | C VACMY Vaccinium myrtillus | Blackberry | BBCH Scale: BPER |
| Entry Date: | Oct-5-2021 | Stage Scale: | BBCH |
| Variety: | Gigante Nero | Planting Rate: | 2 P/m2 |
| | | Planting Density: | 20000 P/ha |
| Rows per Plot: | 1 | | |
| Row Spacing: | 1 m | | |
| Spacing within Row: | 0,5 m | | |

| Pest Description | | | |
|-----------------------|---------------------|-------------------------------|-------------------------------|
| Pest 1 Type: D | Code: BOTRSP | Botrytis sp. | Entry Date: Oct-6-2020 |
| Common Name: | Botrytis sp. | Stage Scale: | BBCH |
| | | Artificial Population: | N |

| Site and Design | | | |
|-------------------------------|----------|-------------------------------------|--|
| Treated Plot Width: | 1 m | Total Plot Width: | 1 m |
| Treated Plot Length: | 5 m | Total Plot Length: | 5 m |
| Treated Plot Area: | 5,0 m2 | Treatments: | 6 |
| Replications: | 4 | Site Type: | GREENH greenhouse |
| % Slope: | 0 | Experimental Unit: | 1 PLOT plot |
| Untreated Arrangement: | INCLUDED | Tillage Type: | CONTIL conventional-till |
| Block Arrangement: | BSSPUP | Study Design: | RACOBL Randomized Complete Block (RCB) |
| | | Plots arranged as in field?: | Y |
| | | | single control randomized in each block |
| | | | all blocks side by side, plots lying upon each other |

| Soil Description | | | |
|--------------------------|-------------------------|---------------------|--------|
| Description Name: | Cavazza Matteo Az. Agr. | | |
| % Sand: | 33,3 | % OM: | 1,3 |
| % Silt: | 45,1 | pH: | 7,6 |
| % Clay: | 21,6 | CEC: | 10,9 |
| Soil Drainage: | G | Texture: | L loam |
| | | Soil Name: | Loam |
| | | Fert. Level: | G good |

| Application Description | | | | | |
|--|-------------|--------------|-------------|--------------|--------------|
| | A | B | C | D | E |
| Application Date | May-10-2021 | May-25-2021 | Aug-16-2021 | Aug-24-2021 | Aug-30-2021 |
| Appl. Start Time | 10:00 | 10:00 | 18:00 | 8:00 | 7:30 |
| Appl. Stop Time | 11:00 | 11:00 | 19:00 | 9:00 | 8:30 |
| Interval to Prev. Appl. | | 15 DAYS | 83 DAYS | 8 DAYS | 6 DAYS |
| Application Method | BROADC | BROADC | BROADC | BROADC | BROADC |
| Application Timing | ACCRST | FIINSP | FIINSP | FIINSP | FIINSP |
| Application Placement | FOLIAR | FOLIAR | FOLIAR | FOLIAR | FOLIAR |
| Appl. Entry Date | Oct-5-2021 | Oct-5-2021 | Oct-5-2021 | Oct-5-2021 | Oct-5-2021 |
| Air Temperature Start, Stop | 15; 16,8 C | 19,6; 20,1 C | 33; 32,1 C | 22,6; 23,1 C | 21,5; 22,6 C |
| % Relative Humidity Start, Stop | 70; 61 | 76; 66 | 54; 56 | 65; 64 | 75; 71 |
| Wind Velocity+Dir. Start | 0 KPH; - | 0 KPH; - | 0 KPH; - | 0 KPH; - | 0 KPH; - |
| Wind Velocity+Dir. Stop | 0 KPH; - | 0 KPH; - | 0 KPH; - | 0 KPH; - | 0 KPH; - |
| Wind Velocity+Dir. Max | 0 KPH; - | 0 KPH; - | 0 KPH; - | 0 KPH; - | 0 KPH; - |
| Wet Leaves (Y/N) | N; no | N; no | N; no | N; no | N; no |
| Soil Temperature | 13 C | 18 C | 30 C | 22 C | 21 C |
| Soil Moisture | NORMAL | NORMAL | NORMAL | NORMAL | NORMAL |
| Soil Surface Condition | MEDIUM | MEDIUM | MEDIUM | MEDIUM | MEDIUM |
| % Cloud Cover | 0 | 0 | 0 | 20 | 30 |
| Weather Source | WSLOCAL | WSLOCAL | WSLOCAL | WSLOCAL | WSLOCAL |

Comment:

Time to treat 1 plot:

- Appl. A: 5.3 s
- Appl. B: 5.3 s
- Appl. C: 7.9 s
- Appl. D: 7.9 s
- Appl. E: 7.9 s

Protocol Application Directions:

Time and frequency of application

- A: BBCH 61
- B: BBCH 65
- C: 14 days before harvest
- D: 6 days before harvest

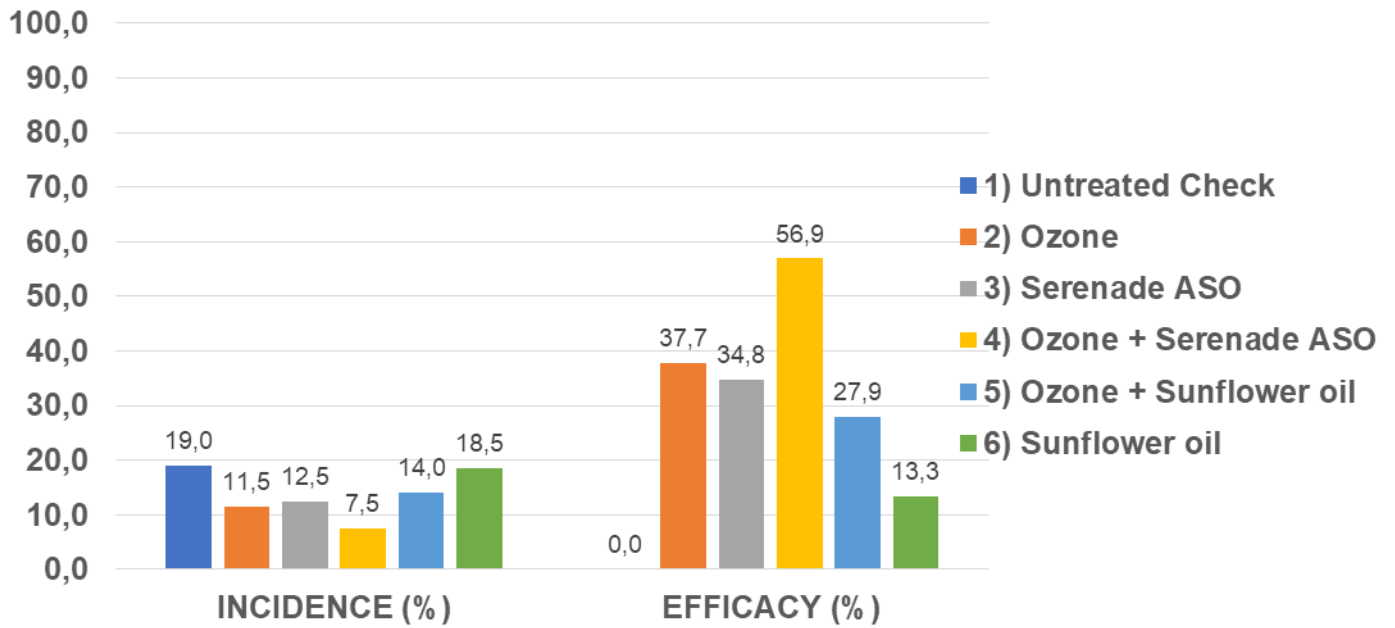
E: 1 day before harvest
Minimum spray interval: 5 days.

Doses and volumes

Use water volume variable following crop growth: 500-1500 L/ha

RESULTS

Incidence on fruits – 6 days after last application



COMMENTS

English version: At the end of the experimental program for the control of *Botrytis* on blackberry, during which 5 applications were carried out based on susceptibility moments of the crop, the untreated check showed an incidence on fruits equal to 19.0%, with a consequent serious damage to the yield. The best result was showed by the Ozone applied in strategy with the standard Serenade ASO, which reduced the *Botrytis* damage to 7,5% of incidence, corresponding to 56.9% of efficacy. Furthermore, this strategy is comparable with the results of the others treatments that ranged from 27.9% of efficacy of the strategy of Ozone and Sunflower oil emulsified and from to 34.8% of the standard Serenade ASO applied alone and to 37.7% of Ozone applied alone. Nevertheless, these last treatments were comparable with the untreated check. Sunflower oil applied alone showed an incidence very close to the check, so a lower efficacy was observed.

Versione italiana: Al termine della strategia sperimentale per il controllo di botrite su mirtillo, durante la quale sono state realizzate 5 applicazioni, basate su i momenti di suscettibilità della coltura, il testimone non trattato ha mostrato un'incidenza sui frutti pari al 19.0%, con conseguente grave danno alla produzione. Il miglior risultato è stato fornito dall'Ozono applicato in strategia con lo standard Serenade ASO, che ha ridotto l'attacco di *Botrytis* al 6,5% di incidenza, corrispondente al 56.9% di efficacia. Inoltre, questa strategia è comparabile con i risultati degli altri trattamenti che erano compresi fra 27.9% di efficacia della strategia di Ozono e Sunflower oil in emulsione e da 34.8% dello standard applicato da solo e dal 37.7% di Ozono applicato da solo. Tuttavia, questi trattamenti erano comparabili con il non trattato. Sunflower oil applicato da solo ha mostrato una incidenza molto vicina a quella del check, pertanto è stata osservata efficacia una bassa efficacia.

CONCLUSION

Conclusions:

English version: Within the test aimed at controlling *Botrytis* on blackberry with the use of organic products, Ozone alone as well the standard Serenade ASO applied alone and the strategy of Ozone plus Sunflower oil emulsified showed efficacy in reducing the disease incidence on fruits but are results comparable with the untreated check. Ozone in strategy with the standard Serenade ASO showed the best control of the disease different from the check but comparable with the others treatments. No symptoms of phytotoxicity were observed.

Versione italiana: All'interno della prova volta al controllo di *Botrytis* su mirtillo con utilizzo di prodotti biologici, l'Ozono da solo come pure lo standard Serenade ASO applicato da solo e la strategia di Ozono più Sunflower oil in emulsione hanno mostrato efficacia nel ridurre l'incidenza della malattia sui frutti ma sono risultati comparabili con il non trattato. Ozono in strategia con lo standard Serenade ASO ha mostrato il miglior controllo della malattia differente dal check ma comparabile con gli altri trattamenti. Non si sono osservati sintomi di fitotossicità.

CONTACTS

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