

Efficacy of Bactericides on *Xanthomonas sp.* on ranunculus

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Purpose: Evaluate some new formulations of bactericides for control of bacterial spot on *Ranunculus asiaticus* 'Magic Pink Peach'

Treatments:	rate/100 gal
A. Noninoculated control	---
B. Inoculated control	---
C. BotryStop and Capsil	48 oz and 4 oz
D. Kalmor	32 oz
E. Daconil ZN	32 oz
F. Daconil WeatherStik	22 oz
G. Daconil Ultrex	22 oz
H. Triathlon	1%
I. Cease	1%

Plants 12 per treatment (120 total) planted from plus on 11 February. The medium was amended with Osmocote Plus minors 19-6-12.

Inocula were started 5 plates of Nutrient agar on 3-19-19.

Mist was started (2 min/30 min 12 hr/day) on 3-20-19.

Plants were inoculated and placed in plastic humidity boxes (for 24 hr) on 3-21-19.

Treatments were applied:

Date	Time	Temperature
3-19-19	10:45-11:15 am	82 F
4-1-19	8:55-9:15 am	76 F
4-9-19	7:00-7:30 am	64 F
4-15-19	7:45-8:10 am	66 F

17 April 2019 disease data (# leaves with bacterial leaf spots/plant)

Trt	1	2	3	4	5	6	7	8	9	10	11	12
A	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	3	2	1	0	2	5	2	1	2	0
C	0	2	0	3	1	1	0	0	0	0	0	0
D	0	0	0	0	0	1	1	0	0	0	0	0
E	0	0	0	0	0	0	0	2	2	0	0	0

F	2	0	1	1	0	0	1	0	0	1	0	0
G	2	0	0	0	0	1	0	0	0	0	0	0
H	0	0	0	0	0	0	0	0	0	0	0	0
I	1	0	0	1	0	0	0	0	0	0	0	0

Normality Test (Shapiro-Wilk):Failed (P < 0.050)
 Equal Variance Test (Brown-Forsythe):Failed (P < 0.050)

Group Name	N	Missing	Mean	Std Dev	SEM
Col 1	12	0	0.000 a	0.000	0.000
Col 2	12	0	1.500 b	1.508	0.435
Col 3	12	0	0.583 ab	0.996	0.288
Col 4	12	0	0.167 a	0.389	0.112
Col 5	12	0	0.333 a	0.778	0.225
Col 6	12	0	0.500 a	0.674	0.195
Col 7	12	0	0.250 a	0.622	0.179
Col 8	12	0	0.000 a	0.000	0.000
Col 9	12	0	0.167 a	0.389	0.112
Source of Variation	DF	SS	MS	F	P
Between Groups	8	20.500	2.563	4.599	<0.001
Residual	99	55.167	0.557	highly significant	
Total	107	75.667			

The differences in the mean values among the treatment groups are greater than would be expected by chance; there is a statistically significant difference (P = <0.001).

Power of performed test with alpha = 0.050: 0.977

All Pairwise Multiple Comparison Procedures (Holm-Sidak method):

Overall significance level = 0.05

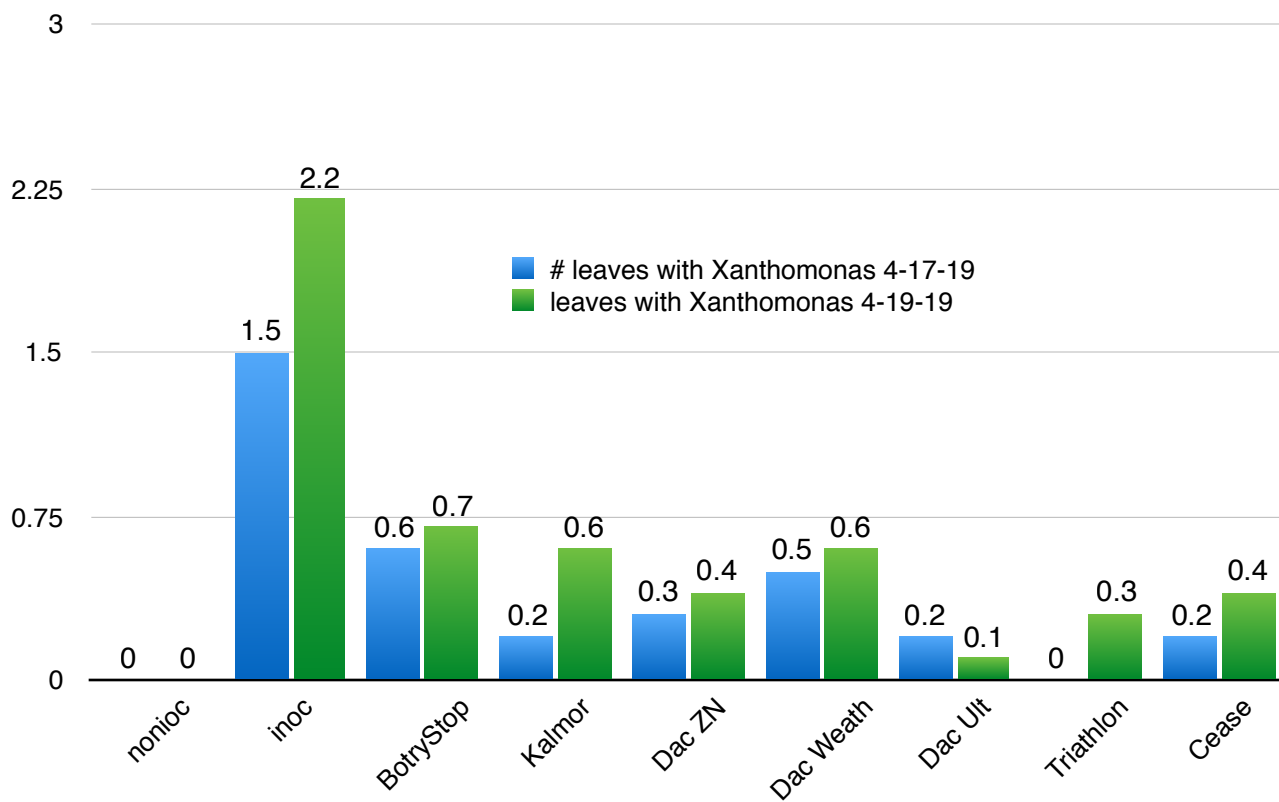
19 April 2019 disease data (# leaves with bacterial leaf spots/plant) (x=missing data)

Trt	1	2	3	4	5	6	7	8	9	10	11	12
A	0	x	0	0	0	0	0	0	0	0	0	0
B	1	0	6	1	1	1	3	6	3	1	3	0
C	2	1	1	1	0	0	1	1	1	0	0	0
D	0	0	2	0	0	0	1	3	0	0	x	x
E	0	0	0	0	0	0	0	2	2	0	x	0
F	2	0	1	1	0	0	0	0	0	2	1	0
G	0	0	0	0	1	0	0	0	0	0	0	0
H	1	x	0	0	0	0	1	0	1	0	0	0
I	0	1	0	1	0	2	0	0	0	x	0	x

Normality Test (Shapiro-Wilk):Failed ($P < 0.050$)
 Equal Variance Test (Brown-Forsythe):Failed($P < 0.050$)

Group Name	N	Missing	Mean	Std Dev	SEM
Col 1	12	0	0.000 a	0.000	0.000
Col 2	12	0	2.167 b	2.082	0.601
Col 3	12	0	0.667 a	0.651	0.188
Col 4	12	2	0.600 a	1.075	0.340
Col 5	12	1	0.364 a	0.809	0.244
Col 6	12	0	0.583 a	0.793	0.229
Col 7	12	0	0.083 a	0.289	0.083
Col 8	12	1	0.273 a	0.467	0.141
Col 9	12	2	0.400 a	0.699	0.221

Source of Variation	DF	SS	MS	F	P
Between Groups	8	39.179	4.897	5.442	<0.001
Residual	93	83.694	0.900	highly significant	
Total	101	122.873			



Top grade was rated on 19 April using the following scale: 1 (dead), 2 (poor, unsalable), 3 (good, salable), 4 (very good, salable) and 5 (excellent, salable). (x=missing data)

Trt	1	2	3	4	5	6	7	8	9	10	11	12
A	4.5	x	4	5	3	5	3	3	2	4	4	2.5
B	3	2.5	4.5	2.5	2.5	2.5	3.5	4	3	3	2.5	2

C	4	4	4.5	3	5	2.5	2	3	2.5	4	4	2
D	2	4.5	2	3	3	2.5	4	3.5	2.5	2	x	x
E	2.5	3.5	3	4	5	2.5	3.5	3	2	3	x	3
F	3.5	4	3	4	2	2.5	5	2.5	3.5	3	3.5	3
G	4.5	4	2.5	4.5	3.5	2	5	2.5	3.5	3	5	4
H	2	x	2.5	4	3	2.5	3	3.5	3.5	3	4	2
I	2	2	2.5	2.5	2	3	4.5	3	3.5	x	3.5	x

Normality Test (Shapiro-Wilk): Passed (P = 0.134)

Equal Variance Test (Brown-Forsythe): Passed (P = 0.095)

Group Name	N	Missing	Mean	Std Dev	SEM
Col 1	12	1	3.636 a	1.002	0.302
Col 2	12	0	2.958 a	0.722	0.208
Col 3	12	0	3.417 a	0.949	0.274
Col 4	12	2	2.900 a	0.876	0.277
Col 5	12	1	3.182 a	0.815	0.246
Col 6	12	0	3.042 a	0.656	0.189
Col 7	12	0	3.667 a	1.008	0.291
Col 8	12	1	3.000 a	0.707	0.213
Col 9	12	2	2.850 a	0.818	0.259

Source of Variation	DF	SS	MS	F	P
Between Groups	8	8.837	1.105	1.536	0.156
Residual	92	66.148	0.719	not significant	
Total	100	74.985			

The differences in the mean values among the treatment groups are not great enough to exclude the possibility that the difference is due to random sampling variability; there is not a statistically significant difference (P = 0.156).

Power of performed test with alpha = 0.050: 0.235

The power of the performed test (0.235) is below the desired power of 0.800.

Less than desired power indicates you are less likely to detect a difference when one actually exists. Negative results should be interpreted cautiously.

Conclusions -

1. None of the treatments significant affected the top grade of the ranunculus in this trial.
2. All of the test products was equally effective in reducing the number of leaves per plant with symptoms of Xanthomonas leaf spot.
3. No obvious phytotoxicity occurred.