

EVALUATION OF COPPER COMPOUNDS, AN SAR INDUCER AND A GROWTH REGULATOR FOR SHOOT BLIGHT CONTROL ON APPLE, 2000: Two copper compounds (Mankocide DF and Phyton 27), an SAR inducer (Messenger) and a growth regulator (Apogee) were evaluated for control of shoot blight on inoculated Idared trees in a research orchard at Geneva, NY. Agrimycin 17 (streptomycin) served as a positive check. Treatments were replicated 5 times in a randomized complete block design and products were applied to entire trees at 3 wk, 2 wk, 1 wk, and 24 h before inoculation, 24 h after inoculation, and 5 wk post bloom, depending on the nature of products. Applications were made using a single nozzle handgun at 150 psi and spraying to run off. Tips of fifteen 15-30 cm long shoots on each tree were inoculated by cutting the two youngest leaves transversely with scissors dipped in 1×10^7 CFU/ml of *E. amylovora* strain Ea. 273. Six wk after inoculation the necrotic lesion length (a) and the total shoot length (b) on inoculated shoots were determined and $a/b \times 100$ (% blighted shoot length) was used as the disease parameter. A week later the frequency of fruit with any russet (% russeted fruit) and the cumulative % russeted fruit surface were determined. In all Apogee treatments a second set of 15 shoots were inoculated at terminal bud set to determine the effect of growth inhibition on secondary shoot infection. Number of strikes/tree, fruit set, and growth (proportion of actively growing shoot tips) were recorded. Data were analyzed by General Linear Model (GLM) procedure (SAS) and treatments were separated by the Waller-Duncan K-ratio T test.

Favorable weather and post bloom hail damage of shoots resulted in 87.3% of shoot length blighted on untreated trees. Agrimycin treatment resulted in 55% disease control. Control by Phyton 27 (50.3%) was not significantly different from Agrimycin, but significantly better than Mankocide (26.3%). Russetting on Phyton 27 treated fruits was not significantly different than on the untreated control, and was significantly less than on Mankocide treated fruits. The best Messenger treatment, 1 and 3 wk before inoculation, gave 31.3% control. This treatment, together with single applications at 1 or 2 wk before bloom gave control significantly different from the untreated check, but significantly less effective than Agrimycin. The best Apogee treatment was two applications during full bloom (3 wk before inoculation) and 5 wk post bloom (2 wk after inoculation) with Regulaid, which resulted in 48.6% control and was not significantly different from Agrimycin. A similar Apogee treatment with Kinetic gave only 19.5% control. Single sprays of Apogee at full bloom or 2 wk post bloom gave 21.5 to 29.9% control. Shoot inoculation of Apogee treated trees at terminal bud set resulted in 2.1% to 8.4% of shoot length blighted vs. 36.4% in untreated control. The number of secondary strikes in Apogee treatments ranged from 36.8 to 52.2 compared to 62.6 strikes in untreated control. The number of actively growing shoot tips was significantly lower in Apogee treated trees compared to control trees. Fruit set was higher in all Apogee treatments applied at bloom.

Treatment	Product (g/50L)	Surfactants (rate/50L)	Time of ¹ appli- cation	Time of ² inocu- lation	% blighted ³ shoot length	Strikes	Growth	Fruit set	%russeted fruit	%russeted surface
Untreated control..				1,2	87.3 a (36.4 a) ⁴	62.6 a	32.1 a	48.5 bc	4.2 b	0.19 a
Agrimycin 17W	14.7	Regulaid 15 ml	4,5	1	39.3 f				6.7 ab	0.30 a
Mankocide 15WP.	79.7	Regulaid 15 ml	4,5	1	64.3 bcde				11.0 a	0.31 a
Phyton 27 EC...	128.2ml	Regulaid 15 ml	4,5	1	43.4 ef				5.3 b	0.17 a
Messenger WP....	25.0	Reguard 100 ml	1	1	78.4 ab				7.0 ab	0.27 a
Messenger WP.....	25.0	Reguard 100 ml	2	1	66.3 bcde				4.4 b	0.24 a
Messenger WP.....	25.0	Reguard 100 ml	3	1	67.6 bcde				4.7 b	0.28 a
Messenger WP.....	25.0	Reguard 100 ml	1,3	1	60.0 bcde				5.2 b	0.10 a
Apogee 27.5DF ⁵ + Thinner ⁶	44.8	Regulaid 15 ml	1,6	1,2	44.9 def (2.1 b)	55.0 a	18.5 c	81.1 a	5.2 b	0.23 a
Apogee 27.5DF + Thinner	44.8	Regulaid 15 ml	1	1,2	61.2 bcde (3.7 b)	36.8 a	18.3 c	71.4 ab	5.5 b	0.16 a
Apogee 27.5DF + Thinner	44.8	Kinetic 31 ml	1,6	1,2	70.3 bcde (8.4 b)	39.8 a	17.1 c	60.6 abc	6.1 ab	0.28 a
Apogee 27.5DF + Thinner	44.8	Regulaid 15 ml	3	1,2	68.6 bcde (4.5 b)	52.2 a	19.9 bc	46.1 bc	5.8 b	0.24 a
Thinner control...			3	1,2	82.7 ab (25.0 a)	66.8 a	25.5 ab	40.7 c	5.6 ab	0.25 a

¹1 = 3 wk before inoculation (full bloom, 10May); 2=2 wk before inoculation (17 May); 3=1 wk before inoculation (2 wk post bloom; 24 May); 4=24h before inoculation; 5= 24 after inoculation; 6= 5 wk post bloom.

²Inoculation:1=3 wk post bloom (1 June); 2= 6 wk post bloom (21 June).

³Treatments followed by the same letter did not differ significantly ($P>0.05$) as determined by Waller grouping.

⁴Figures in parenthesis are proportion of shoot blighted following late inoculation.

⁵For all Apogee treatments spray water was preconditioned with ammonium sulfate (AMS) 22.4 g/50 L.

⁶Sevin XLR, 5 qt/100 gal.