

CONTROL OF FIRE BLIGHT INFECTION OF APPLE SHOOTS: EFFECTS ON SHOOT GROWTH AND FRUIT RUSSETING, 1999: The efficacy of two antibiotics, two copper compounds, two systemic acquired resistance inducers, and a growth regulator against infection of shoots by fire blight was evaluated on 'Idared' trees in a research orchard at Geneva, NY. Treatments were replicated five times with each replicate consisting of a single tree in a randomized complete block design. All treatments were applied to run off using a single nozzle handgun sprayer at 350 psi. Following the treatments, 20 growing tips of current season shoots, 20-40 cm long, from each tree, were inoculated by bisecting the two youngest leaves with scissors dipped in  $1 \times 10^7$  CFU ml<sup>-1</sup> of *E. amylovora* strain Ea 273. Shoots of cv. Empire were inoculated as an untreated moderately resistant check. All inoculated shoots were labeled. Six weeks after inoculation the lengths of necrotic infection and of the whole shoots, including the infected length, were determined. At the same time the number of actively growing non-inoculated shoots on each tree was also determined. A week latter, the proportion of russeted fruit and of the russeted fruit surface area was estimated. The data were analyzed by the General Linear Model (GLM) procedure (SAS) and the significant difference among treatments was determined by the Waller-Duncan K-ratio T test.

In 1999, the weather was conducive for shoot blight development and 89% of shoot length became blighted on the inoculated untreated check Idared trees, which was significantly ( $P > 0.05$ ) higher than for all other treatments. Pace and Agrimycin treatments, which were both streptomycin formulations, applied before and after inoculation, gave the highest level of control (61% and 56%, respectively). There was no significant difference in the level of control obtained with Agrimycin, Actigard, Messenger or Apogee treatments applied prior to inoculation. The best Apogee treatment, however, was almost identical with Pace 17. The time of application of Apogee seems to be critical for optimal control of shoot blight. Apogee applied 10 days after inoculation gave less control than applied before inoculation. The percent shoot tips that were actively growing was significantly lower in all Apogee treated trees, when compared with the untreated check. The Mankocide and Phyton 27 treatments were both significantly better than the untreated check, but not as good as the streptomycin treatments or the best Apogee treatment, and both resulted in fruit russeting, although Phyton 27 caused significantly fewer russeted fruits than Mankocide.

Treatment (rate/50L)	Surfactants (rate/50L)	Time of application <sup>1</sup>	% blighted shoot length <sup>2</sup>	% growing shoots	% russeted fruit	% russeted fruit surface
Untreated control .....			89.7 a	82.8 a	0.2 c	1.0 bc
Empire (inoculated) .....			7.2 g			
Pace 17 14.7 g .....	Regulaid 15 ml	4,5	35.2 f	66.6 abc	0.3 c	0.5 c
Agrimycin 17 14.7 g ..	Regulaid 15 ml	4,5	39.9 ef	65.8 abcd	0.0 c	0.0 c
Mankocide DF 79.75 g .	Regulaid 15 ml	4,5	55.8 bcd	79.6 ab	21.3 a	4.5 a
Phyton 27 13.3 ml ....	Regulaid 15 ml	4,5	61.0 b	59.0 cdef	6.9 b	4.1 a
Actigard 50 WG 10.0 g .	Regulaid 15 ml	2,3	50.8 bcde	73.2 abc	0.6 c	0.6 c
Messenger 26.0 g .....	Reguard100 ml	2,3	43.9 def	73.2 abc	0.6 c	3.0 ab
Apogee 22.4 g .....	Kinetic 31 ml	1,2	47.2 cdef	48.6 def	0.3 c	0.7 bc
Apogee 44.8 g .....	Kinetic 31 ml	1,2	47.5 bcdef	42.4 f	0.0 c	0.0 c
Apogee 44.8 g .....	Kinetic 31 ml	3	35.9 f	47.8 ef	0.5 c	0.5 c
Apogee 44.8 g .....	Kinetic 31 ml	6	60.0 bc	64.8 bcde	0.2 c	1.0 bc

<sup>1</sup> 1 = Petal fall + 5 days (May 21), 2 = 2 weeks after #1 (June 4), 3 = 1 week before inoculation (11 June), 4 = 24 h before inoculation (16 June), 5 = 24 h after inoculation (18 June), 6 = 10 days after inoculation.

<sup>2</sup> Treatments followed by the same letter did not differ significantly ( $P > 0.05$ ) as determined by Waller grouping.