Streptomycin vs. copper for

CONTROLLING FIREBLIGHT OF PEAR

in California, 1970

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TABLE 1. ALL BLIGHT STRIKES COUNTED BY INVESTIGATORS MAY 21, 1970

Plot	Number of strikes*	
	visual counts	actually cut
(1) 8 oz Streptomycin per acre at 200 gallons per acre	0,5,1,0,0,2,0,0, 0,1 Total = 9	2,0,1,1,0,0,0,3, 0,0 Total = 7
(2) 8 oz Streptomycin per acre at 22 gallons per acre	2,2,1,2,0,2,0,1, 0,1 Total = 11	1,1,1,4,0,1,2,1, 0,1 Total = 12
(3) 24 oz Streptomycin per acre at 200 gallons per acre	0,0,1,0,0,0,0,0, 0,0 Total = 1	2,0,0,1,3,1,1,0, 0,0 Total = 8
(4) ¼ lb Kocide 101 copper w.p. per 100 gallons water using 200 gallons per acre	4,7,0,2,0,0,1,2, 1,2 Total = 19	22,4,5,9,7,0,10, 1,7,10 Total = 75
(5) Copper 20–80 dust at 15 lbs per acre	10,28,15,41,24,33, 20,29,25,21 Total = 246	No cuts made here at this time
(6) Untreated check	26,16,23,15,14,7, 21,10,31,31 Total = 194	32,58,72,40,41,18, 30,23,43,12 Total = 369

* Individual figures preceding totals are the number of blight strikes per tree.

FIELD EXPERIMENTS to compare streptomycin with copper for control of fireblight of pears were conducted on the Natomas Company Ranch, east of Sacramento, under conditions which were compatible with a commercial pear growing operation. This pear ranch was selected for use because of the extensive fireblight present there during 1969. The trees in this 12-year-old Bartlett pear orchard were planted 20 ft by 20 ft (109 trees per acre).

The blight control chemicals used in these experiments were as follows: (1) streptomycin wp (17% active); (2) Kocide 101 wp copper hydroxide (copper expressed as elemental—56%); and (3) Copper 20–80 dust. The following amounts and rates of each material were used per acre: (1) 8 oz. streptomycin 17% wp in 250 gallons of water, using 200 gallons of the spray per acre; (2) 8 oz. streptomycin 17% wp in 25 gallons of water, using 22 gallons of the spray per acre; (3) 24 oz. streptomycin 17% wp in 250 gallons of water, using 200 gallons of the spray per acre; (4) ¼ lbs. of Kocide 101 copper wp per 100 gallons of water, using 200 gallons of the spray per acre; and (5) Copper 20–80 dust applied at the rate of 15 lbs per acre.

Application equipment

A Spraymaster conventional airblast orchard sprayer with a 500-gallon tank was used on the 200-gallon-per-acre plots; an Econ-O-Mist concentrate spray rig, with a 90 gallon tank, was used on the 22-gallon-per-acre plot; and a conventional orchard airblast duster was used on the copper dust plot.

Each of the six plots in these experiments, including the untreated check, was approximately 1⅓ acres with about 140 trees in each plot. Spray and dust applications were made beginning at 5% bloom stage on the following dates: March 26, March 31, April 4, April 9, April 15 and April 22.

Efficacy data were based on two types of fireblight strike counts. First, ten trees were selected at random from the center of each plot and a visual count of blight infections was made by the investigators

Entire pear scaffold branches are often infected by fireblight and must be removed to save the rest of the tree.

If fireblight conditions are severe and not controlled, the entire pear tree may be lost.

TABLE 2. HYGROTHERMOGRAPH TEMPERATURE AND HUMIDITY DATA RECORDED DURING THIS STUDY

Week ending	Temperature over 65°F	Humidity over 50% R.H.
	hours	hours
March 22, 1970	35	135
March 29, 1970	51	98
April 5, 1970	71.5	98.5
April 12, 1970	19	131
April 19, 1970	30.5	110
April 26, 1970	31	109
May 3, 1970	33	133
May 10, 1970	62.5	85.5
May 17, 1970	85	87.5

on each of these trees. Second, ten trees were selected at random from the center of each plot and professional blight cutters cut all infected shoots out of each tree, dropping the cuttings on the ground below each tree. The investigators then counted the blight cuts made. Table 1 gives the number of blight strikes counted visually, as well as actual cuts made by blight cutters.

Tree selection

The trees selected for visual counts and those selected for actual blight cuts were not necessarily the same; thus, there were differences in numbers (as noted in table 1). In addition, the blight cutters used ladders to gain access to blight in the tops of the trees that the investigators may not have been able to observe from the ground. Table 2 gives temperature and humidity data recorded during the course of this study.

Even without statistical analyses of the visual blight strike counts, or actual blight cut, it can be said that streptomycin provided very good fireblight control. However, the cost of the 24-oz-rate of streptomycin would be considered carefully by the average pear grower.

The Kocide 101 copper treatments provided marginal control, while the copper 20–80 dust, based on visual counts only, provided poor control.

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COMFREY

as a feed for swine

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Under the conditions of these experiments, dehydrated comfrey was not a suitable ingredient for a laboratory rat ration at the 20% level, where it supplied half of the protein, and it was completely unsatisfactory at the 40% level. The swine digestion trial indicated that the comfrey used had a dry matter content of 12.1% digestible crude protein, and 52.7% TDN content. The ratings for crude protein, total digestible nutrient content and nitrogen-free extract were all lower for comfrey than for the control ration.

THE RELATIVELY HIGH PROTEIN content and yield of comfrey (*Symphytum peregrinum*) make it of interest as a possible protein source in the rations of such monogastric animals as swine. The dietary study reported here was conducted to yield preliminary information.

An analysis of comfrey dry matter (table 1), shows the level of crude protein is about 25 per cent. The crude fiber level appears moderate (about 12½%), but ash is high (over 23%). An initial crude palatability test using two 150-lb hogs indicated that they would consume reasonable quantities of a ration containing up to 40% dehydrated comfrey. Higher levels were not fed.

Rat rations

Purified rat rations were designed containing about 10% crude protein and levels of 0, 20 and 40% dehydrated comfrey. Nitrogen and crude fiber contents of the three rations were equalized using casein, comfrey and cellulose (see table 2).

Thirty, 21-day old Sprague Dawley male rats were divided at random between the three groups and fed individually *ad libitum* for a 21-day trial. The results are summarized in table 3. Analysis of variance statistics indicated highly significant differences ($P < 0.01$) in both gain and feed consumption. It is notable that all ten rats lost weight continuously through the trial on the 40%-comfrey ration, but about 56% of the weight loss occurred in the first week. One rat in the 20%-comfrey group lost weight continuously and succumbed on the sixth day. The differences between all rations for gain and feed consumption were highly significant ($P < 0.01$), except that the difference between feed consumption of the two comfrey groups was significant ($P < 0.05$). While the 40% comfrey group lost weight, the difference between the feed-per-unit-of-gain in the rats fed the control, and 20% comfrey rations was highly significant. Adjustment of gains to equal food consumption (170.1 gm) by covariance indicated that the differences between adjusted gains (58.3, 26.1 and –2.1 gm, respectively) were still highly significant. Analysis of variance of the relation of gain to comfrey level indicated the reduc-