DETERMINING THE CAUSE OF PRUNE RUSSET SCAB AND CONTROL TRIALS

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ABSTRACT

The results of our study indicate that application of IAA-producing strains (R299 and T565) of fluorescent Pseudomonas spp. did not affect the incidence nor the severity of russet scab (RS) on green, mature, or dehydrated fruit. Fixed copper (Kocide 101) sprayed at full bloom one or three days after the application of R299 bacteria on misted trees significantly increased both the incidence and the severity of RS on green, mature, and dehydrated fruit. In addition, Kocide applied on non-misted trees during full bloom significantly increased the incidence and the severity of RS on green and dehydrated fruit.

Misting trees at petal-fall stage caused significantly greater incidence and severity of RS than misting during full bloom. Russet scab of fruit developed on trees misted at full-bloom stage did not differ from that on fruit from non-misted trees. In all cases, fruit collected near the misters developed significantly greater incidence and severity of RS than those collected far from the misters. These results suggest that RS is triggered by the presence of free water on the young developing prune ovary, especially during the petal-fall stage.

INTRODUCTION

Although the market for fresh French prunes increases each year, the bulk are still produced for drying. The two major disorders affecting dried French prunes are skin-slip maceration, or box rot, a disorder of prunes caused by postharvest decay primarily by Rhizopus spp., and russet scab (RS), whose cause remained unknown for years. Both these "diseases," however, originate in the field and show their extent after dehydration of prunes. In years of heavy rains during bloom, as in 1963 and 1967, russet scab can cause major financial losses to prune qrowers and processors (3). Severe RS lowers the quality of the dried fruit and increases costs for sorting. Initially, because of the netted pattern on the fresh fruit, this condition was named "lacy scab" and growers still refer to it by this name. Corbin et al. (3) named it "russet scab" to describe the appearance of the affected dried prunes. Since the russetting or lace-like symptoms ususally develop on the stylar end of prune fruits, it is also called "jacket scab".

"Wind scab," another disorder which affects prunes, causes symptoms similar to russet scab. Its symptoms develop on areas where leaves, shoots, or other fruits brush the surface of the fruit, damaging the cuticular layers and creating russetted, scabby areas.

Unlike russeting on apples and pears, russeting on prunes was not associated earlier with the application of chemicals on the flowers

or young developing fruits since orchards receiving no sprays in the growing season frequently show severe RS. In 1989, Clark and Lindow (2) showed that russeting of Bartlett pear fruit at harvest was significantly increased by application to pear flowers at 50% bloom bacteria that produce indole-3-acetic acid (IAA).

OBJECTIVES:

1. Because rains were associated with severe RS, we wanted to determine whether artificial misting of blossoms induces russet scab in French prunes.

2. Because IAA-producing bacteria were reported to induce russeting on Bartlett pear, we wanted to determine whether these bacteria induce russeting in French prunes.

3. Since fungicides have been reported to control RS, we wanted to test additional chemicals.

PROCEDURE:

To determine the cause of russet scab of prunes we selected a commercial prune orchard in Easton (Fresno County), California, and developed a mist generator, which consisted of a delivery system with three independent main lines and an electrical outdoor irrigation automatic controller. The water source was garden irrigation water connected to the mist generator with a garden hose. Each delivery line was connected with one solenoid valve. The operation (shut off and turn on) of the valves was controlled by the contoller connected to 220 V ac, 60 Hz, electrical supply. Mist nozzles were attached to drip tubing, which served as risers from the main delivery lines, and the drip tubing was then attached to 10-feet electrical tubes (3 per tree). Tubes were inserted in the soil and the misters were attached to the upper part of the tubes with electrical tape and were directed towards branches with dense blossoms.

Trees at full bloom on 23 March 1990 were sprayed with the following: IAA-producing fluorescent Pseudomonas spp., strains R299 and T565, (obtained from S. E. Lindow, Department of Plant Pathology, University of California, Berkeley) at a concentration of ca. $1X10^5$ cells/ml; a solution of IAA at 1,000 uM; captan at 2 lbs/100 gallons of water; and a suspension of R299 strain of fluorescent Pseudomonas sp., followed after either one or three days with fixed copper (Kocide 101) at a concentration of 3 lbs/100 gallons of water. Immediately after the spray applications, the misting system was turned on and operated as follows: night of 23 March 1990, 5 sec mist bursts every 59 min; day of 24 March 1990, 5 sec bursts every 30 min until 26 March 1990 (7 a.m.), when the misting was set at 5 sec every 5 min until 2 April (9:30 a.m.) when misting was turned off. Three non-misted trees served as dry controls in a complete randomized block design.

In another experiment, four replicated trees in two rows of prune

trees adjacent to wet (misted) treatments, were sprayed with the following: captan (Captan 50W) at 2 lbs/100 gallons water; chlorothalonil (Bravo 720) at 3 pts/100; fixed copper (Kocide 101 at 3 lbs/100 gallons of water. To induce RS, four trees were sprayed with trichloroacetic acid (TCA) at 227.1 g/100 gallons of water. The experiment was set in a complete randomized block design.

In a third experiment, six trees were misted as described previously from the night of 2 April until the night of 3 April for 5 sec bursts every 30 min and then for 5 sec every 5 min until 9 April 1990. Three of these trees were sprayed with R299 at a concentration of $1X10^5$ cells/ml.

To determine if blossoms or small developing fruit were affected by the misting, all wet branches were flagged during operation of the misting system. Disease was evaluated on 15 May 1990 directly on 100 green fruits on each tree. At commercial harvest time, all prune fruits on the flagged shoots (near the misters and far from the misters) were harvested from all the misted trees and a maximum of 100 fruits/tree were evaluated for RS. Disease severity index was determined by categorizing the RS symptoms in five categories: 0=healthy, 4=the most severe symptoms, and 1 to 3 intermediate severity categories (see previous Prune Annual Research Reports). For all data statistical analysis was done with ANOVA and mean differences were determined by Duncan's Multiple Range Test, using SAS Statistics.

RESULTS:

Effects of Interaction of IAA-Producing Bacteria, Chemical Application, and Misting (Green Fruit). Full-Bloom Misting. The application of IAA-producing bacteria (strains R299 and T565) as well as misting the blossoms during full bloom (23 March until 2 April 1990) did not result in increased levels of incidence or severity of RS (Table 1), nor did application of IAA solution induce russet scab. Captan application did not affect RS levels on green fruit in comparison with the untreated fruit (Table 1). However, application of Kocide either one or three days after R299 was applied significantly increased both the incidence and severity of russet scab (Table 1).

Petal-Fall Misting. Application of strain R299 during petal fall on trees misted from 2 April until 9 April did not induce higher levels of russet scab in comparison with that developed on fruits from trees not sprayed (Table 2). However, incidence and severity of RS on fruits from trees that received the petal-fall misting were higher than those from trees misted during full bloom or not misted (Fig. 1A-B).

None of the chemicals sprayed on non-misted trees reduced the incidence and severity of RS in comparison with the untreated controls (Table 3). In fact, spraying with fixed copper (Kocide

101) significantly increased the incidence and severity of RS on green fruit evaluated on 15 May 1990 (Table 3).

Kocide did not affect the population of mycoflora of prune flowers except the propagules of Alternaria alternata, which were lower one day after application of Kocide than on the untreated control. However, propagules of A. alternata did not differ from those of the untreated controls 3-6 days later. Also, significantly lower populations of Aureobasidium pullulans were recorded 6 days after the application of Kocide than on the untreated flowers.

Effects of Interaction of IAA-Producing Bacteria, Chemical Application, and Misting (Mature fruit). Full-Bloom Misting. Because symptoms of russet scab on fruit found close to the misters were more severe than on fruit far from the misters on the misted branches (Fig. 2), evaluation of fruit and statistical analysis of data were done on fruit samples collected both near and far from the misters. The application of IAA-producing bacteria and IAA solution did not affect either incidence or severity of RS on fruit harvested near the misters in comparison with the control. Only Kocide applied one or three days after application of bacteria (R299 strain) significantly increased the incidence and severity of RS (Table 4). Analogous results were recorded on fruits collected from areas in misted branches far from the misters (Table 4), except that captan resulted in significantly lower incidence and severity of RS than the untreated control (Table 4).

Petal-Fall Misting. Prunes harvested near the misters from trees misted during petal fall, whether sprayed or not sprayed with R299, had significantly higher incidence and severity of RS than prunes harvested near the misters from trees misted during full bloom (Table 5). However, only fruits harvested from trees sprayed with R299 far from the misters had higher incidence and severity of RS than prunes harvested from trees not sprayed with R299 and misted either during full bloom or petal fall (Table 5).

When results of petal-fall misting were compared with those from trees not misted, the petal-fall misting resulted in significantly higher incidence and severity of RS on fruit harvested near the misters (Table 6). Again, fruits collected from trees that received the petal-fall misting and had been sprayed with R299 showed the highest incidence and severity of RS in comparison with fruits harvested far from the misters in trees misted during petal fall or not misted and not sprayed with bacteria (Table 6). In the petal-fall misting experiment, significantly higher incidence and severity of RS developed on fruits harvested from near rather than far from the misters (Figs. 3 & 6B).

Chemical Control. Mature fruit harvested from non-misted trees sprayed with Kocide and TCA showed a trend towards higher incidence of RS while those sprayed with Bravo 720 or captan showed reduced RS in comparison with the untreated control. However, differences in disease index (severity) among the treatments were not significant (Table 7).

Effects of Interaction of IAA-Producing Bacteria, Chemical Application, and Misting (Dehydrated Fruit). Full-Bloom Misting. Significantly higher incidence and severity of RS developed on dehydrated fruit harvested near the misters from trees sprayed with Kocide either one or three days after application of R299 bacteria and misted during full bloom (Table 8). The bacteria alone or the application of IAA solution did not induce RS in comparison with the control. Similarly, captan did not reduce the level or the severity of RS on fruits from trees misted during full bloom (Table 8). A higher incidence of RS ($F = 17.5$; $P < 0.001$) of greater severity ($F = 8.8$; $P < 0.01$) developed on fruit harvested near the misters than on fruit harvested far from the misters (Fig. 4).

Petal-Fall Misting. In the late misting experiment, dehydrated fruits harvested near the misters showed more severe RS and a trend towards a higher incidence of RS (Table 9). Russet scab on prunes harvested from trees sprayed with R299 did not differ significantly from RS of prunes not sprayed with these bacteria.
Significantly higher incidence and more severe RS developed on fruit from late-misted trees than on fruit from non-misted trees (Table 10). Incidence and severity of RS on fruit collected near the misters was significantly higher than on fruit harvested far from the misters (Figs. 5 & 6B).

Chemical Control. Dehydrated fruit harvested from non-misted trees sprayed with Kocide and TCA had significantly greater incidence and severity of RS than the control while Bravo and captan did not reduce RS (Table 11).

CONCLUSIONS:

The results of our study indicate that the application of IAA-producing strains (R299 and T565) of fluorescent Pseudomonas spp. did not affect the incidence nor the severity of RS on green, ripe, or dehydrated fruit even after misting the trees for 7 days at full bloom. Recovery of higher numbers of bacteria than had been applied on the blossoms indicates that these bacteria were able to multiply on the blossoms and misting did not wash them away. Kocide applied at full bloom induced russet scab on misted and non-misted trees. Cupric fungicides have been reported to induce russeting on pome fruit (1).

Fruits collected near the misters had higher levels and more severe russet scab, indicating that the amount of water applied on developing fruits had a direct effect on the amount of russet scab developed. Fruits far from the misters get wet for shorter periods of time and receive smaller amounts of water, resulting in lower levels of russet scab on these fruits.

Misting the trees at the petal-fall stage caused significantly greater incidence and severity of RS than misting during full bloom, indicating that rains which may occur during petal-fall stage might be more critical for RS development than those during full bloom. This is in agreement with the belief of growers that

rains after bloom are more critical for RS development than rains before or during full bloom. A comparison of the dates of full bloom of prune trees in an experimental orchard at the University of California, the days after full bloom when a rain occurred, the times and the amount of rainfall in March or April, and the incidence and severity of RS for 1982 through 1990 indicate a very strong correlation (Table 12). RS was severe only in 1982, 1983, and 1986, when rain occurred 1-7 days after full bloom (Table 12).

Significantly higher incidence of RS developed on fruits harvested from trees misted during petal fall or during full bloom than on fruits harvested from non-misted trees. In previous studies, Michailides et al. (5) showed that spraying trees from full-bloom to petal-fall stage with water to runoff induced RS development. The results of this study confirm those findings. Since epiphytic bacteria, such as the fluorescent Pseudomonas spp., are not involved in the induction of RS, the cause of RS could be physiological, triggered by free moisture (rain, dew, sprinkler water) on the surface of the young developing ovary. Similarly, Montgomery (6) and Dalbro (4) reported that rains induced russeting of apples also.

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Table 1. Effects of interaction of IAA-producing strains of *Pseudomonas* spp., chemical application, and misting of prune blossoms during full bloom on russet scab of green fruit

Treatment[1]	Russet scab (%) in severity category[2,3]: "3"	"4"	Russet scab (%)[3]	Russet scab index[3]
R299 + Koc 1 day	19.3 a[4]	26.6 a	72.9 a	2.05 a
R299 + Koc 3 day	20.0 a	23.4 a	78.3 a	2.10 a
IAA	6.8 b	5.0 b	42.9 b	0.85 b
T565	5.7 b	3.2 b	42.6 b	0.75 b
R299	4.6 b	1.6 b	29.7 b	0.50 b
Captan	4.2 b	2.5 b	30.5 b	0.54 b
Control	4.0 b	1.0 b	41.7 b	0.65 b

[1] Bacteria and chemicals were applied on 23 March 1990 when prune trees were at full bloom. Misting was initiated on the night of 23 March and terminated the morning of 2 April 1990.

[2] Severity categories: 0 = healthy; "4" = the most severe russeting; and "1", "2", and "3" = intermediate severity categories.

[3] Means of three 100-fruit replications (evaluation on 15 May 1990).

[4] Means in each column followed by different letters are significantly different at $P < 0.05$ (Duncan's Multiple Range Test).

Table 2. Effects of interaction of IAA-producing bacteria and misting of prune trees at petal fall on russet scab of green fruit

Treatment[1]	Russet scab (%) in severity category[2,3]: "3"	"4"	Russet scab (%)[3]	Russet scab index[3]
R299	8.3 a[4]	18.7 a	59.3 a	1.43 a
Petal-fall misting	5.0 a	27.7 a	62.0 a	1.65 a

[1] Bacteria (R299) were applied on 2 April 1990 when prune trees were at petal fall stage; misting was initiated on 2 April and terminated on 9 April 1990.

[2] Severity categories the same as in Table 1.

[3] Means of three 100-fruit replications (evaluation on 15 May 1990).

[4] Significance at $P < 0.05$ (DMRT).

Table 3. Effects of chemical application on russet scab on green fruit of 'French' prune

Treatment[1]	Russet scab (%) in severity category[2,3]: "3"	"4"	Russet scab (%)[3]	Russet scab index[3]
Control	6.3 b[4]	2.5 b	37.0 b	0.69 b
TCA	5.8 b	2.8 b	45.5 b	0.77 b
Captan	6.0 b	1.5 b	36.8 b	0.64 b
Bravo 720	4.0 b	2.3 b	36.5 b	0.64 b
Kocide 101	14.0 a	16.0 a	67.8 a	1.60 a

[1] Chemicals were applied on 23 March when prune trees were at full bloom.

[2] Russet scab index: severity categories: "0", "1", "2", "3", and "4" same as in Table 1.

[3] Means of four 100-fruit replications (evaluation on 15 May 1990).

[4] Significance at $P < 0.05$ (DMRT).

Table 4. Effects of interaction of IAA-producing bacteria, chemical application, and misting during full bloom on russet scab (RS) of ripe prune fruit

Treatment[1]	Russet scab on fruit near misters[2]			Russet scab on fruit far from misters[3]		
	In category "4" (%)[4]	RS (%)[4]	RS index[4]	In cagetory "4" (%)[4]	RS (%)[4]	RS index[4]
R299 + Koc 1 day	24.8 a[5]	68.5 a	1.96 a	21.1 a	60.2 a	1.67 a
R299 + Koc 3 day	33.6 a	69.7 a	2.23 a	11.0 b	41.3 a	1.14 b
R299	7.6 b	37.1 b	0.96 b	1.7 cd	19.0 cd	0.42 cd
T565	6.7 b	37.5 b	0.89 b	3.0 cd	23.3 cd	0.48 cd
IAA	4.4 b	22.5 b	0.57 b	1.4 cd	17.1 cd	0.39 cd
Captan	3.2 b	20.0 b	0.46 b	0.7 d	11.0 d	0.20 d
Control	8.2 b	33.9 b	0.91 b	7.3 bc	27.3 c	0.74 c

[1] Bacteria and chemicals were applied on 23 March when prune trees were at full bloom.

[2] Fruits were collected from branches close to the misters.

[3] Fruits were collected from branches far from the misters.

[4] Means of three 33-100 fruit replications (evaluation on 9 August).

[5] Significance at $P < 0.05$ (DMRT).

Table 5. Effects of interaction of IAA-producing bacteria and misting during full bloom and petal fall on russet scab (RS) of ripe prune fruit

Treatment[1]	RS on fruit near misters[2]				RS on fruit far from misters[2]			
	In category "3"	In category "4"	RS (%)	RS index	In category "3"	In category "4"	RS (%)	RS index
R299	20.7 a[3]	36.6 a	71.3 a	2.33 a	14.0 a	9.0 a	46.3 a	1.25 a
Petal-fall misting	15.1 ab	32.3 a	62.9 a	1.97 a	7.3 b	3.7 a	24.0 b	0.55 b
Full-bloom misting	11.7 b	8.2 b	33.3 b	0.91 b	9.0 ab	7.3 a	27.3 b	0.74 ab

[1] Bacteria were applied on 2 April at petal fall stage of prune trees; petal-fall misting: 2 April to 9 April; and full-bloom misting: 23 March to 2 April.

[2] Means of three 33-100 fruit replications (evaluation on 9 August).

[3] Significance at $P < 0.05$ (DMRT).

Table 6. Effects of IAA-producing bacteria, misting at petal fall, and no misting on russet scab (RS) of ripe prune fruit

Treatment[1]	RS on fruit near misters[2]				RS on fruit far from misters[2]			
	In category "3"	In category "4"	RS (%)	RS index	In category "3"	In category "4"	RS (%)	RS index
R299	20.7 a[3]	36.6 a	71.3 a	2.33 a	14.0 a	9.0 a	46.3 a	1.15 a
Petal-fall misting	15.1 b	32.3 a	62.9 a	1.97 a	7.3 b	3.7 a	24.0 b	0.55 b
No misting	4.7 c	4.0 b	21.7 b	0.52 b	7.3 b	5.2 a	25.5 b	0.65 b

[1] Bacteria were applied on 2 April and trees misted from 2 April - 9 April (petal-fall misting); full-bloom misting: 23 March - 2 April.

[2] Means of three 33-100 fruit replications (evaluation on 9 August).

[3] Significance at $P < 0.05$ (DMRT).

Table 7. Effects of chemical application on russet scab (RS) development on ripe prune fruit

Treatment[1]	RS (%)[2]	RS index[2]
Kocide 101	34.3 a[3]	0.80 a
TCA	32.6 ab	0.70 a
Control	23.4 ab	0.58 a
Bravo 720	20.8 b	0.48 a
Captan	19.8 b	0.48 a

[1] Chemicals were applied with a handgun sprayer in the morning of 23 March 1990 on four replicated trees.

[2] Means of four 100-fruit replications (evaluation on 9 August).

[3] Significance at $P < 0.05$ (DMRT).

Table 8. Effects of IAA-producing bacteria, chemical application, and misting during full bloom of prune trees on russet scab (RS) on dehydrated fruit

Treatment[1]	RS on fruit near misters[2] In category "3"	"4"	RS (%)	RS index	RS on fruit far from misters[2] In category "3"	"4"	RS (%)	RS index
R299+Koc 1 day	5.1 ab[3]	8.0 a	33.3 a	0.75 ab	3.8 a	6.0 a	27.7 a	0.60 a
R299+Koc 3 day	7.8 a	8.3 a	33.8 a	0.81 a	1.0 b	1.3 b	9.3 b	0.17 b
R299	2.5 ab	0.8 a	20.6 ab	0.32 abc	0.3 b	0.7 b	8.0 b	0.12 b
T565	0.3 b	0.3 a	15.0 b	0.20 bc	0.7 b	0.3 b	6.7 b	0.10 b
IAA	1.5 b	0.0 a	8.5 b	0.13 c	0.0 b	0.0 b	6.3 b	0.08 b
Captan	0.0 b	3.0 a	12.7 b	0.23 bc	0.7 b	0.0 b	4.1 b	0.06 b
Control	1.6 b	0.4 a	12.9 b	0.18 c	0.7 b	0.0 b	6.7 b	0.09 b

[1] Bacteria and chemicals were applied on 23 March on three replicated trees. Misting from 23 March until 2 April 1990.

[2] Means of three 33-100 fruit replications (evaluation on 2 November).

[3] Significance at $P < 0.05$ (DMRT).

Table 9. Effects of interaction of IAA-producing bacteria, petal-fall misting, and full-bloom misting on the incidence and severity of prune russet scab (RS) on dehydrated fruit

Treatment[1]	RS on fruit near misters[2] In category "4" (%)	RS (%)	RS index	RS on fruit far from misters[2] RS (%)	RS index
R299	8.9 a[3]	29.6 a	0.71 a	11.0 a	0.19 a
Petal-fall misting	10.5 a	28.8 a	0.73 a	6.7 a	0.09 a
Full-bloom misting	0.4 b	14.5 a	0.23 b	2.7 a	0.05 a

[1] Bacteria were applied on 2 April and trees misted from 2 April to 9 April (petal-fall misting); full-bloom misting: 23 March - 2 April.

[2] Means of three 33-100 fruit replications (evaluation 2 November).

[3] Significance at $P < 0.05$ (DMRT).

Table 10. Effects of interaction of IAA-producing bacteria, misting at petal-fall, and non misting on the development of russet scab (RS) on dehydrated fruit

	RS (%) on fruit near misters[2]						RS (%) on fruit far from misters[2]					
Treatment[1]	"1"	"2"	"3"	"4"	RS	Index	"1"	"2"	"3"	"4"	RS	Index
R299	10.3a[3]	5.9a	4.4a	8.9a	29.6a	0.71a	6.3a	2.7a	1.0a	1.0a	11.0a	0.19a
Petal-fall misting	10.1a	3.4ab	4.7a	10.5a	28.8a	0.73a	1.3a	0.7a	0.3a	0.3a	2.7a	0.05a
Full-bloom misting	5.7b	0.7b	0.0b	0.0b	6.3b	0.07b	6.0a	1.3a	0.0a	0.0a	7.3a	0.09a

[1] Bacteria were applied on 2 April and trees misted from 2-9 April (petal-fall misting).

[2] Means of three 33-100 fruit replications (evaluation on 2 November).

[3] Significance at $P < 0.05$ (DMRT).

Table 11. Effects of chemical application on the development of russet scab (RS) on dehydrated prunes

Treatment[1]	RS (%) in category[2] "3"	"4"	RS (%)[2]	RS index[2]
Kocide	3.5 a[3]	2.3 a	23.3 a	0.41 a
TCA	0.8 b	0.0 b	15.7 b	0.19 b
Bravo 720	0.3 b	0.8 b	13.2 bc	0.18 b
Captan	0.8 b	0.5 b	13.5 bc	0.19 b
Control	0.0 b	0.0 b	6.8 c	0.08 b

[1] Chemicals were applied on 23 March 1990 on four replicated trees.

[2] Means of four 100-fruit replications (evaluation on 2 November).

[3] Significance at $P < 0.05$ (DMRT).

Table 12. Relationship between times and levels of rainfall during March after full-bloom of 'French' prune at the experimental plots of the University of California, Davis and incidence and severity of russet scab

Year	Date of full bloom in March	Days after full bloom rain occurred	Number of rains and levels in:[1] March No.	March Rainfall (mm)	April No.	April Rainfall (mm)	Incidence of russet scab (%)[2] Preharvest (May to July)	Harvest (August)	Russet scab index at harvest (August)
1982	19	7	7	76	11	138	78	23	2.2
1983	11	1	12	125	9	78	73	35	2.1
1984	14	0	4	12	3	8	24	9	0.4
1985	19	7	3	35	1	8	ND	21	0.3
1986	5	2	9	123	3	18	82	75	2.0
1987	28	13	0	0	2	4	36	13	0.6
1988	13	37	0	0	2	32	48[4]	4[4]	0.7
1989	12	1	5	43	3	6	TR	TR	0.3
1990	15	43	0	0	2	7	TR	TR	0.1

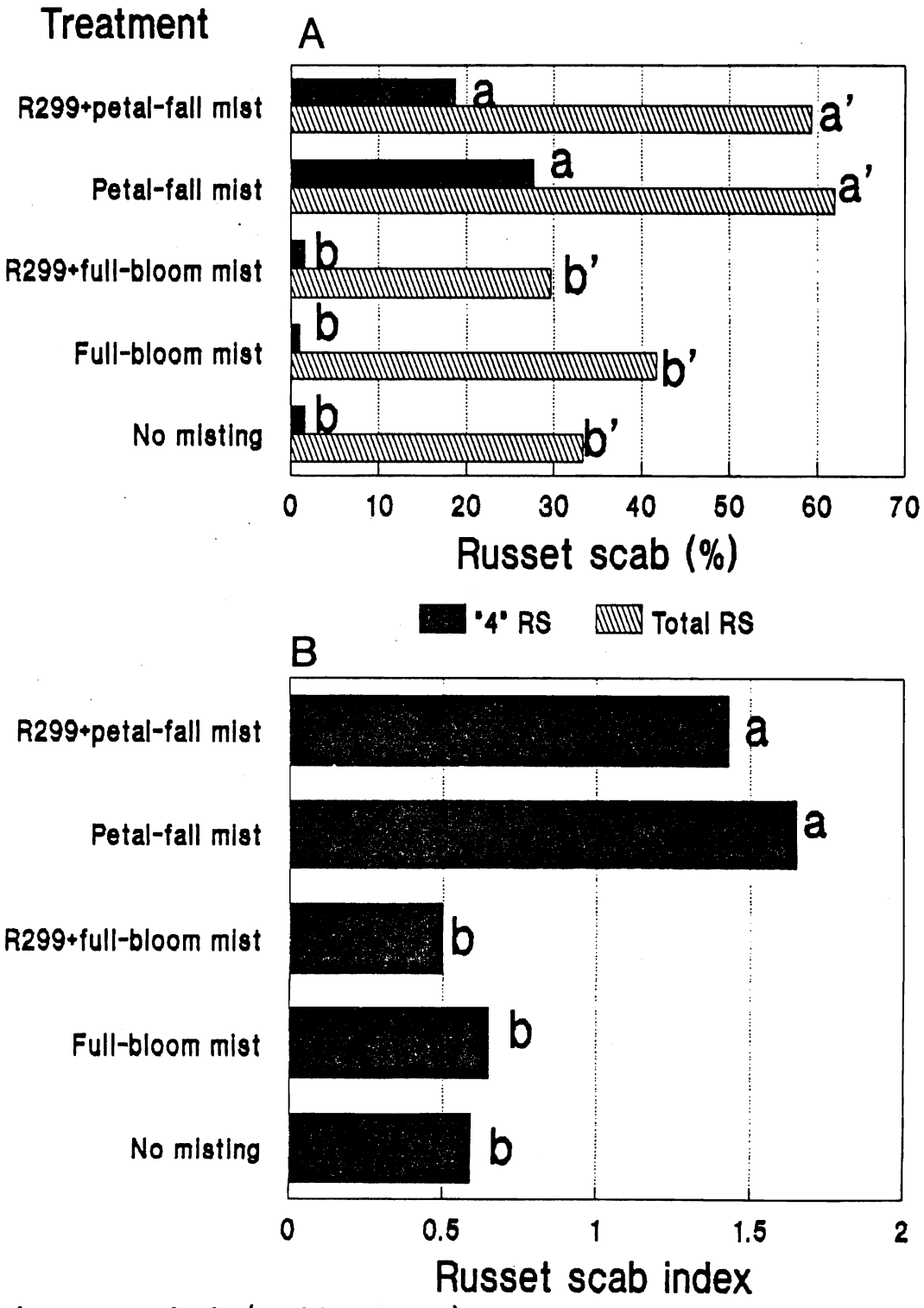
[1] Rainfall data were obtained from CIMIS Station #6 (Name: Davis. A; station code CAYOAAA2), which is adjacent to experimental plots at the University of California, Davis.

[2] One hundred fruit from each of six to eight unsprayed trees were evaluated for russeting symptoms; all (0 to 4) russet scab severity categories are included.

[3] Russet scab index is based on five (0 to 4) severity categories; 100 fruit from each of six to eight unsprayed trees were evaluated just before commercial harvest.

[4] Values were corrected for 28% of fruit with "wind scab" symptoms.

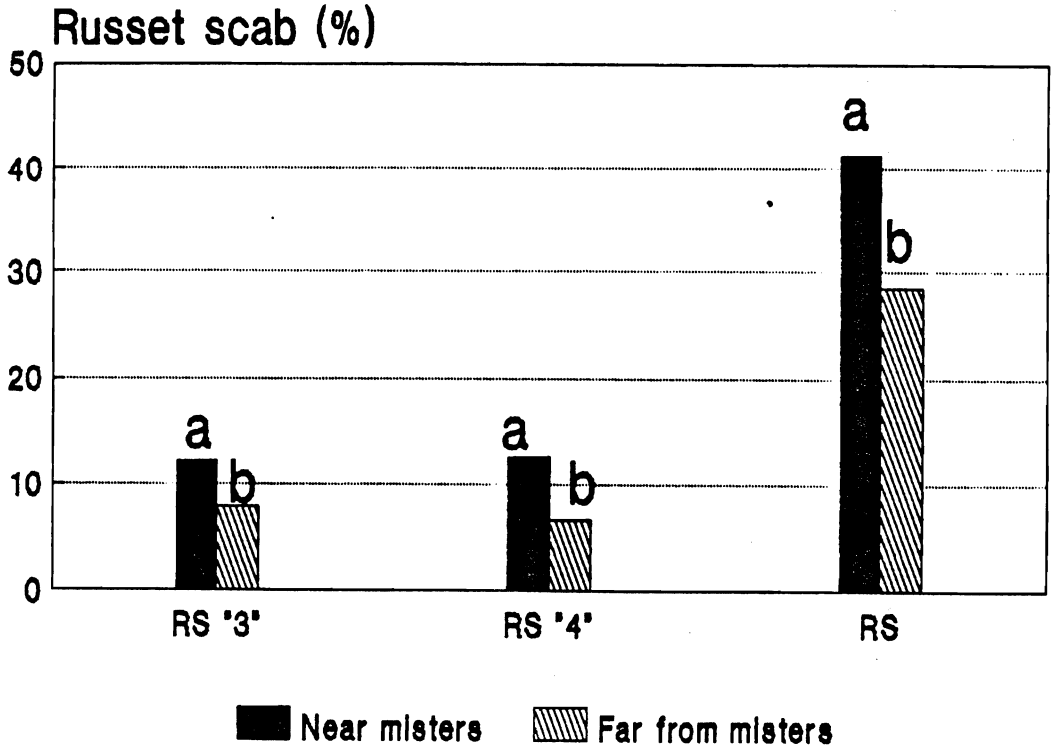
Interaction of IAA-Producing Bacteria and Misting on Prune Russet Scab



On immature fruit (15 May 1990).

Fig. 1 (A-B)

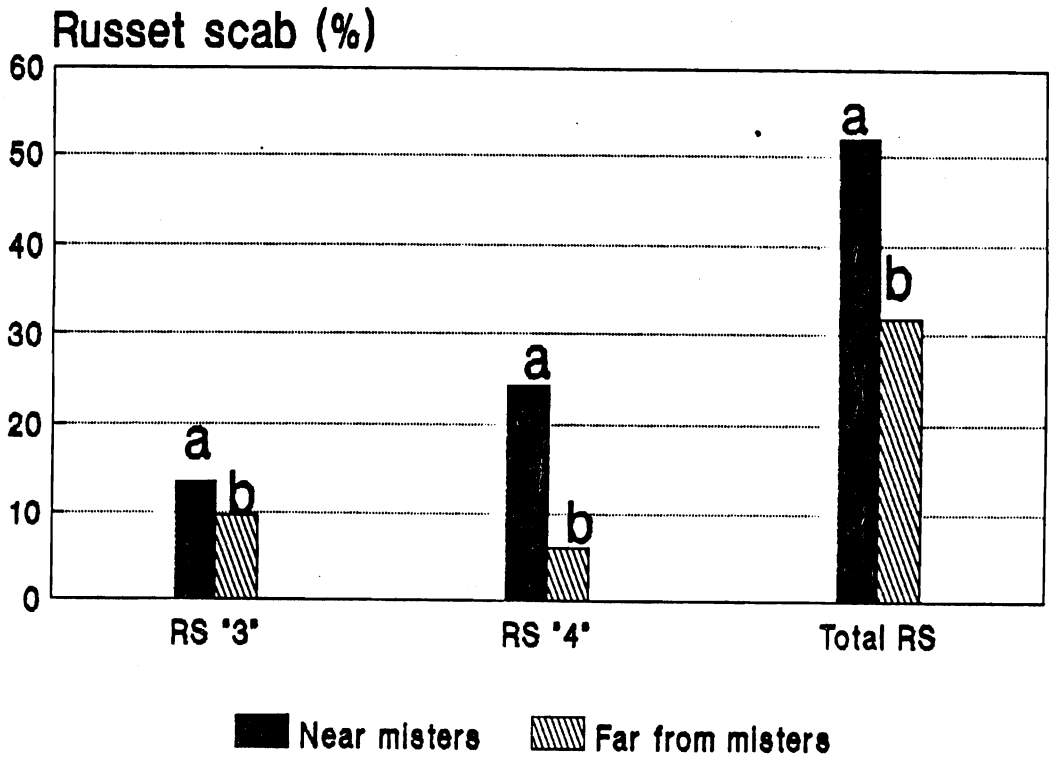
Russet Scab on Mature Prune Fruit Misted with Water during Full Bloom



Means of three 100-fruit replications.

Fig. 2

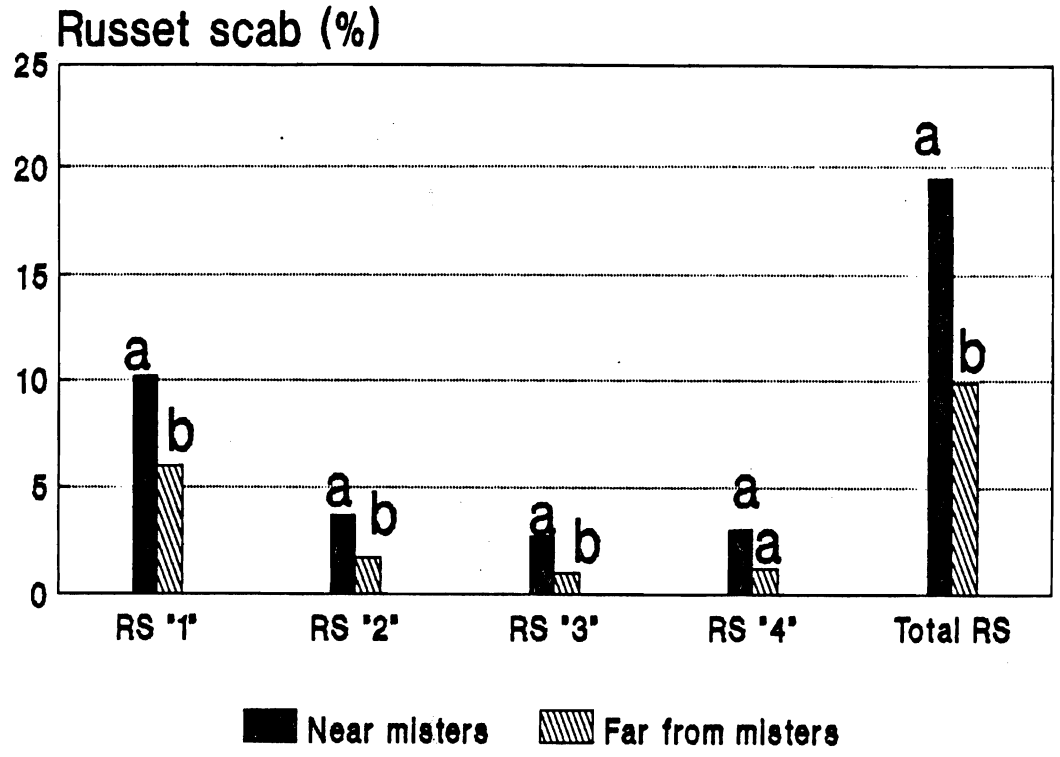
Russet Scab on Mature Prune Fruit Misted with Water during Petal Fall



Means of three 100-fruit replications.

Fig. 3

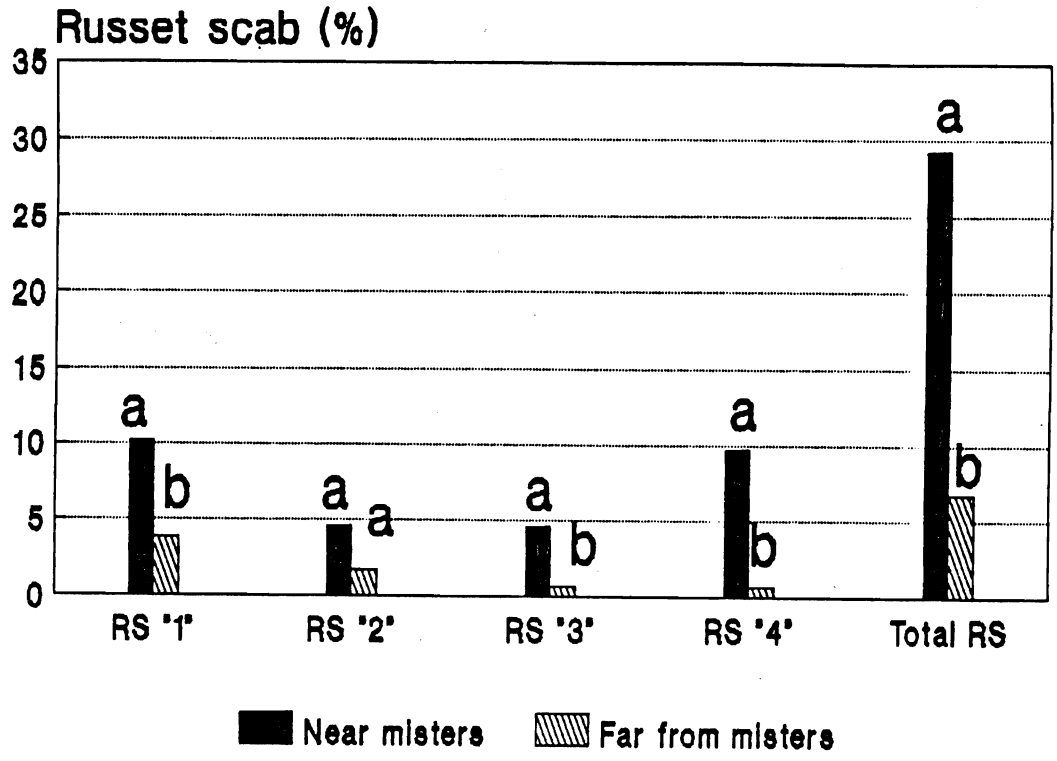
Russet Scab on Dehydrated Prune Fruit Misted with Water during Full Bloom



Means of three 33-100 fruit replications

Fig. 4

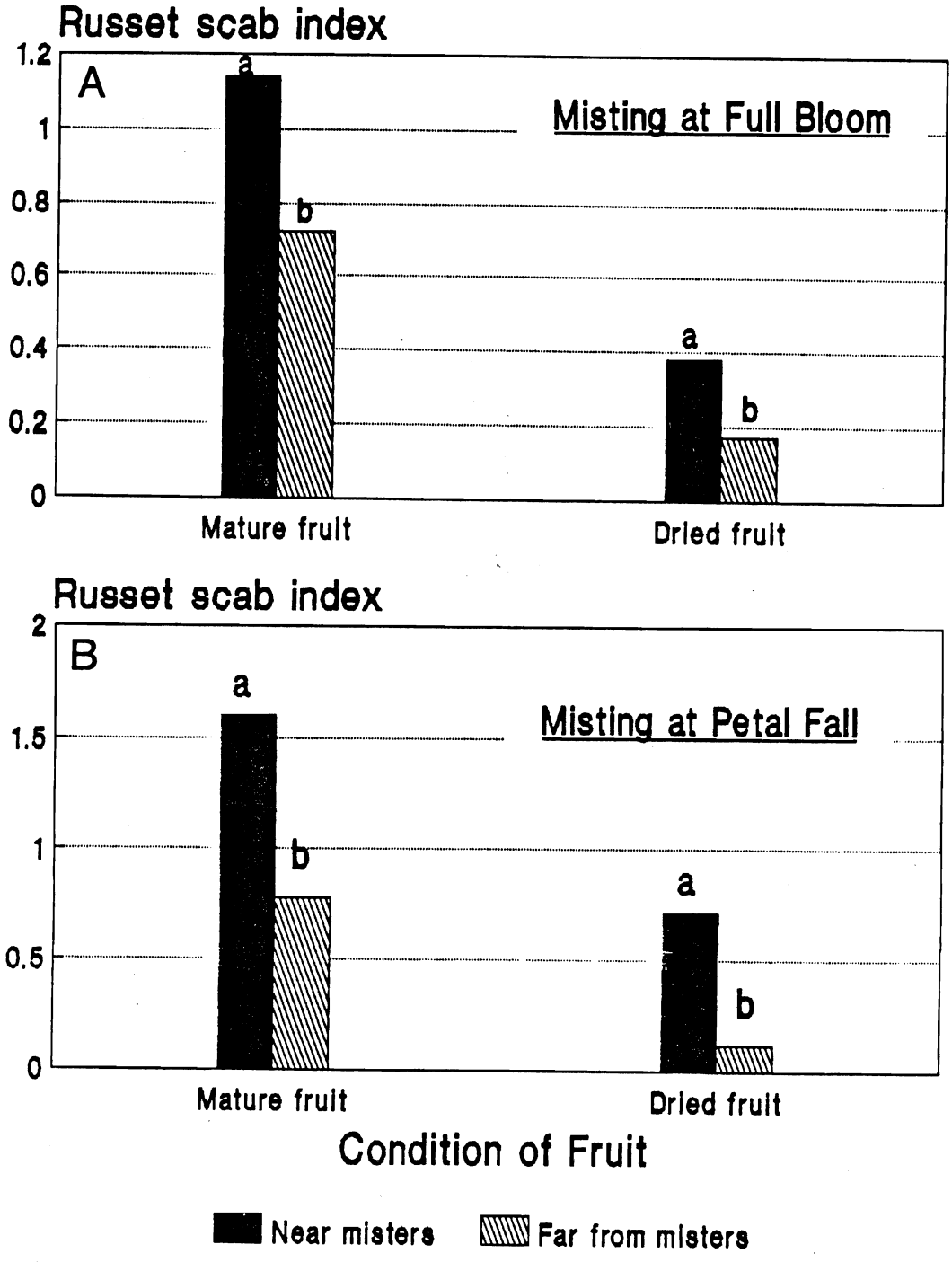
Russet Scab on Dehydrated Prune Fruit Misted with Water during Petal Fall



Means of three 33-100 fruit replications

Fig. 5

Effects of Misting of Prune Blossoms on Russet Scab Severity (RS Index)



Means of 33-100 fruit replications.

Fig. 6 (A-B)