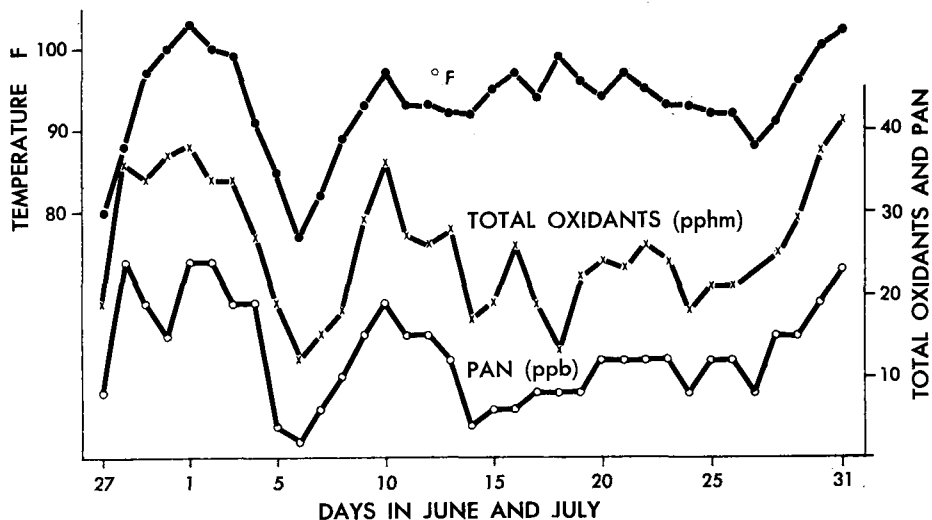
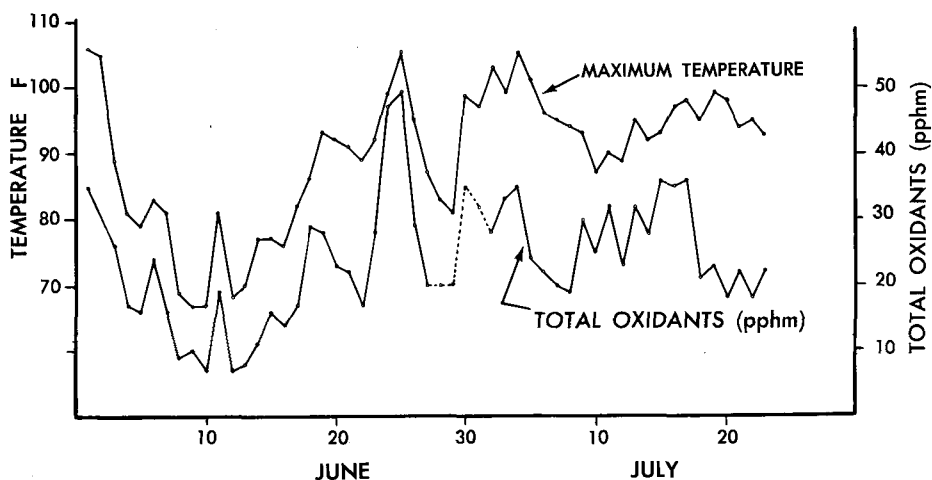


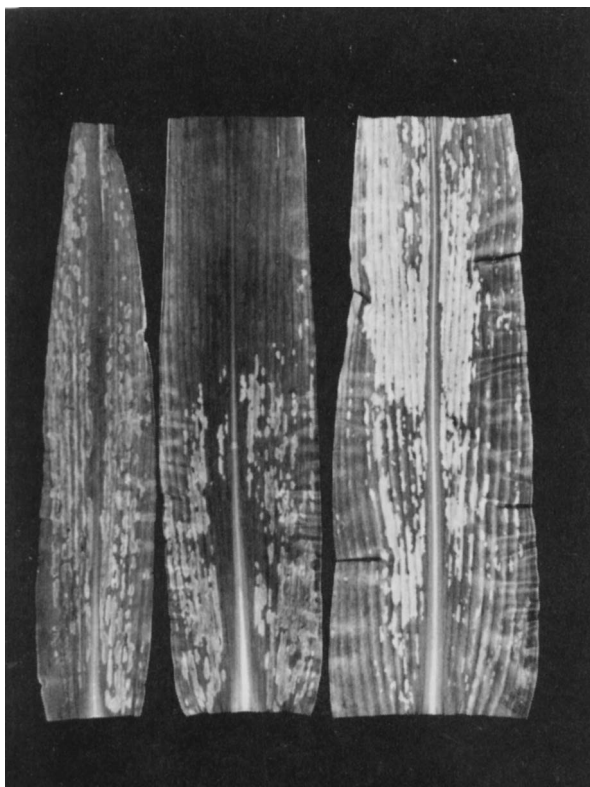
GRAPH 1. MAXIMUM LEVELS OF TEMPERATURE AND OXIDANTS AT RIVERSIDE, 1969



GRAPH 2. MAXIMUM LEVELS OF TEMPERATURE AND OXIDANTS AT RIVERSIDE, 1970



Air pollution oxidant damage to successively (left to right) older leaves on a sweet corn plant.



pearance, and yield. It is not certain how any of these factors were affected by the smog attacks, since no plants were grown in nonpolluted air. Leaf damage that occurred on some varieties was of considerable magnitude, and greatly reduced the photosynthetic area. It is probable that the reduction in some cases was great enough to have slowed growth or reduced yield or quality. In the 1969 Riverside planting, many ears with 2- or 3-inch sterile tips and shrivelled tip kernels were present among the severely damaged varieties, but only a few among the smog-resistant ones. Among the resistant varieties, most were of acceptable market quality, and a few proved to have highly desirable characteristics in the Riverside plantings. These included Bonanza, E-3596, Jubilee, and 58-1804C.

H. Johnson, Jr. is Extension Vegetable Specialist and J. W. Cameron is Geneticist, Department of Plant Sciences; O. C. Taylor is Horticulturist, Statewide Air Pollution Research Center, University of California, Riverside.

Controlling ROSE in

A. O. PAULUS

POWDERY MILDEW OF ROSE, caused by the fungus, *Sphaerotheca pannosa*, results in unsightly leaves and flowers and may cause reduced growth. Recently, several new systemic and non-systemic fungicides have become available. These studies were initiated to evaluate these new materials for powdery mildew control in southern California.

Fall trial—1969

Thirty rose plants (in 5-gallon cans) of the variety Command Performance, were used per treatment, through the courtesy of the Howard Rose Company, Hemet. Each treatment was replicated five times.

The treatments with rates of materials per 100 gallons of water were: Actidione PM 0.027% 2 lb; Benlate 50W 8 oz; El 273 4.5% 20 ppm (190cc) and 40 ppm (380cc), and the check or no treatment. Applications were on an approximate 14-day spray schedule, November 3, 17 and December 1. Sprays were applied to run-off with a 2-gallon Hudson sprayer at 40 psi. Disease symptoms were rated on a scale of 0 to 5 on December 8—a "zero" rating indicating no disease symptoms, while a "five" rating indicated mildew completely covering both sides of the leaves and numerous mildew colonies on petiole and stem.

Applications of El 273 at 40 ppm on a two-week spray schedule gave significantly better results than all other materials tested, El 273 20 ppm, Benlate and Actidione were intermediate in control of rose powdery mildew and were significantly better than the check treatment.

Winter plot—1970

This experiment was designed to compare different rates of fungicide and spray interval and to assess the effect of the addition of Nu-Film to the Benlate spray with relation to possible enhanced

POWDERY MILDEW

field and nursery

J. NELSON • F. SHIBUYA • M. MILLER • R. G. MAIRE

control. The rose variety Command Performance was again used in this trial. Sprays were applied as in the previous trial and the 14-day schedule was applied on March 6, 20 and April 2 and the 28-day schedule on March 6 and April 2. Treatments and rates per 100 gallons of water were as follows: El 273 4.5% 45 ppm (427cc) and 90 ppm (855cc); Benlate 50W 1 lb plus 1 qt Nu-Film; Actidione PM 0.027% 3 lb 2 oz; and the check or no treatment. Plants were sprayed to run-off.

El 273 45 ppm and Benlate plus Nu-Film applied on a 14-day spray schedule was significantly better than all other treatments. El 273 90 ppm sprayed every 28 days and Actidione applied every 14 days gave intermediate control and were significantly different from the check. Leaves and stems of the check plants were completely covered with mildew and gave the plant a white appearance. The extent of control of rose powdery mildew with different spray intervals and fungicides appears to be dependent upon the rate of growth of the plant and the severity of mildew.

Spring trial, 1970

Benlate with or without Nu-Film and El 273 at different rates of material were compared for powdery mildew control on a 14- vs 21-day spray schedule. A total of 80 one-gallon Command Performance rose plants were used per treatment, furnished through the courtesy of Howard Rose Company. Treatments and rates per 100 gallons of water were: El 273 4.5% 50 and 110 ppm; Benlate 50W 8 oz; Benlate 50W 8 oz plus 1 qt Nu-Film and the check or no treatment. Materials were applied with a gasoline-powered Mitchell sprayer at 100 psi. Plants were sprayed to complete coverage. Plots were replicated

four times. The 14-day sprays were applied on April 2, 16 and 30 and the 21-day sprays on April 2 and 23. Notes on disease incidence were taken on May 11.

The 14-day spray interval of either Benlate alone, Benlate plus Nu-Film or El 273 50 ppm gave the best control. Benlate plus Nu-Film was significantly better than Benlate alone on a 21-day spray schedule. Heavy luxuriant growth of the rose plants occurred during this spring trial, and suggesting that, under these conditions, sprays must be applied at least every 14 days.

Ontario trials—spring 1970

Two trials were conducted at Armstrong Nursery, Ontario, to compare various chemicals for powdery mildew control on several rose varieties. Treatments and rates per 100 gallons of water were: El 273 4.5% 50 ppm; Benlate 50W 8 oz plus 1 qt Nu-Film; Parnon 4% 50 ppm; Actidione PM 0.027% 3 lb 2 oz; El 273 4.5% 80 ppm; and the check or no treatment. Treatments were applied on a 14-day spray schedule on March 30, April 13 and 20—except for the El 273 80 ppm treatment which was applied on a 21 day schedule on March 30 and April 30. Sprays were applied to run-off with a 2-gallon Hudson sprayer at 40 psi.

In one trial a 30-ft hedge of Red Glory variety was used per replication, with a total of four replications. The varieties Garden Party, Garnette, Christian Dior and Blithe Spirit were used on the second trial. A total of 10 roses was sprayed per variety and the different varieties were used as the replicates. Disease ratings were taken on a scale of 0 to 5 on May 6.

El 273, 50 ppm, and Benlate plus Nu-Film gave significantly better control with the Red Glory variety while in the

four-variety test EL 273, 50 ppm, was significantly better than all other materials tested. Parnon was significantly better than the check in the Red Glory trial, but was not significantly better than the check in the four-variety trial. El 273, 80 ppm, applied on a 21-day spray schedule gave intermediate control. Parnon, 50 ppm, was significantly inferior to El 273 in both trials when applied on a 14-day spray schedule.

Albert O. Paulus is Extension Plant Pathologist; J. Nelson and F. Shibuya are Extension Laboratory Technicians, University of California, Riverside. M. Miller is Farm Advisor, Riverside County, and R. G. Maire is Farm Advisor, Los Angeles County.

TABLE 1. RESULTS OF CHEMICAL TREATMENTS FOR THE CONTROL OF ROSE POWDERY MILDEW, FALL 1969 TRIALS, HEMET

Treatments	Disease Rating* December 8
El 273 4.5% 40 ppm (380cc)	0.4 a**
El 273 4.5% 20 ppm (190cc)	1.3 b
Benlate 50W 8 oz.	1.3 b
Actidione PM 0.027% 2 lb.	1.8 b
Check or no treatment	2.6 c

TABLE 2. COMPARISON OF FUNGICIDES AND SPRAY INTERVAL FOR CONTROL OF ROSE POWDERY MILDEW, WINTER 1970 TRIALS, HEMET

Treatments	Spray interval	Disease rating* April 14
El 273 4.5% 45 ppm (427cc)	14-day	0.25 a**
Benlate 50W 1 lb plus 1 qt Nu-Film	14-day	0.75 a
El 273 4.5% 90 ppm (855cc)	28-day	2.04 b
Actidione PM 0.027% 3 lb. 2 oz.	14-day	2.97 b
Check or no treatment		4.16 c

TABLE 3. COMPARISON OF SPRAY INTERVAL AND ADDITION OF ADJUVANTS FOR CONTROL OF ROSE POWDERY MILDEW, SPRING 1970 TRIAL, HEMET.

Treatments	Spray interval	Disease rating* May 11
El 273 4.5% 50 ppm	14-day	0.6 a**
Benlate 50W 8 oz.	14-day	0.8 ab
Benlate 50W 8 oz. plus Nu-Film 1 qt.	14-day	1.4 abc
El 273 4.5% 110 ppm	21-day	1.7 c
Benlate 50W 8 oz. plus Nu-Film 1 qt.	21-day	2.0 c
Benlate 50W 8 oz.	21-day	2.9 d

TABLE 4. COMPARISON OF FUNGICIDES FOR THE CONTROL OF POWDERY MILDEW ON SEVERAL ROSE VARIETIES, ONTARIO, SPRING 1970

Treatments	Spray interval	Disease Rating* May 6	
		Red Glory	Four Varieties
El 273 4.5% 50 ppm	14-day	1.4 a**	1.3 a**
Benlate 50W 8 oz. plus 1 qt. Nu-Film	14-day	1.8 ab	2.4 b
El 273 4.5% 80 ppm	21-day	2.6 bc	2.4 b
Parnon 4% 50 ppm	14-day	2.7 bc	3.5 c
Actidione PM 0.027% 3 lb. 2 oz.	14-day	92.8 c
Check or no treatment		4.0 d	4.3 c

* Disease ratings: 0 = no disease symptoms; 5 = mildew completely covering both sides of the leaves, and numerous mildew colonies on petioles.

** Duncan's Multiple Range test (significant at 1% level). Treatments with same letter are not significantly different.