Research brief . . .

Outdoor experiments for controlling ROSE POWDERY MILDEW

OUTDOOR EXPERIMENTS for control of powdery mildew of rose, resulting from infection by *Sphaerotheca pannosa*, were conducted at Livermore in 1969. Twelve plants of the variety "Forever Yours" were used per treatment, and each treatment was replicated three times. The roses were sprayed once every two weeks (with two exceptions when the intervals were three weeks) from July 23 until November 24 and 25 when results were recorded. All treatments were applied as sprays and all of the foliage was treated to the point of run-off. Triton B1956 spreader-sticker was added to each spray treatment at the rate of 1.2 ml (¼ tsp) per gallon.

Results

The results (see table) show that all materials gave control as compared with the untreated checks. All of the Parnon and Benlate treatments gave better control than Karathane, which is now the most commonly used material for powdery mildew control on outdoor roses. However, of the materials tested, only Parnon and Karathane are presently available and are recommended for powdery mildew control on roses.—*Robert D. Raabe, Professor; and Joseph H. Hurlimann, Laboratory Technician II, Department of Plant Pathology, University of California, Berkeley.*

ROSE POWDERY MILDEW CONTROL ON THE VARIETY "FOREVER YOURS"

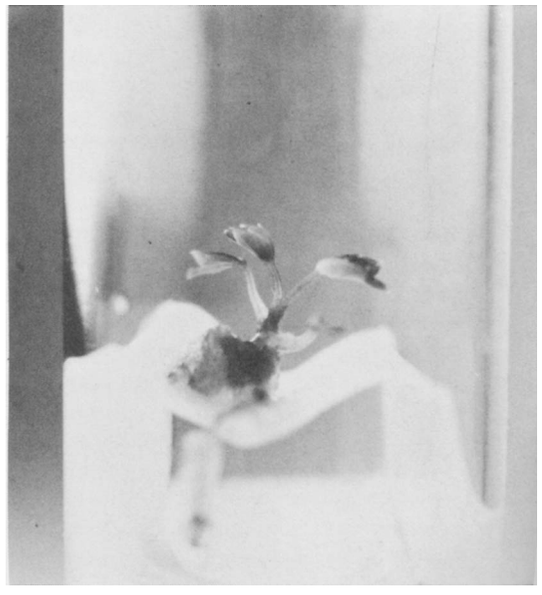
Spray treatment	Conc./gal. or ppm active material	Equivalent conc. of formulated material	Number of infected leaves	Percentage of leaf surface infected	Disease rating*
CS8248					
1.2% Parnon (Emulsion)	30 ml	6 tsp/gal	28.1	9.5	2.7
CS8527					
2% Parnon (Emulsion)	22 ml	4½ tsp/gal	23.9	11.1	2.7
CS8529					
2.6% Parnon (Emulsion)	15 ml	3 tsp/gal	28.5	11.0	3.1
CS8254					
1.5% Parnon + 75% Phaltan	10.4 gms	⅓ oz/gal	58.3	10.6	6.2
CS8253					
3% Parnon + 75% Phaltan	10.4 gms	⅓ oz/gal	82.2	11.0	9.0
Benlate					
(50% active)	50 ppm	1⅓ oz/100 gal	55.3	7.3	4.0
	100 ppm	2⅔ oz/100 gal	44.1	9.1	4.0
	200 ppm	5⅓ oz/100 gal	31.6	9.8	3.1
Mertect					
(60% active)	25 ppm	½ oz/100 gal	84.4	20.8	17.6
	50 ppm	1 oz/100 gal	73.5	23.2	17.1
	100 ppm	2 oz/100 gal	80.4	16.9	13.6
Buckman TCMTOB					
(65% active)	50 ppm	1 oz/100 gal	84.0	23.3	19.6
	100 ppm	2 oz/100 gal	80.3	23.8	19.1
	200 ppm	4 oz/100 gal	64.7	17.7	11.5
Karathane	4 gms	14.1 oz/100 gal	58.6	16.2	9.5
Untreated check			110.7	32.5	35.9

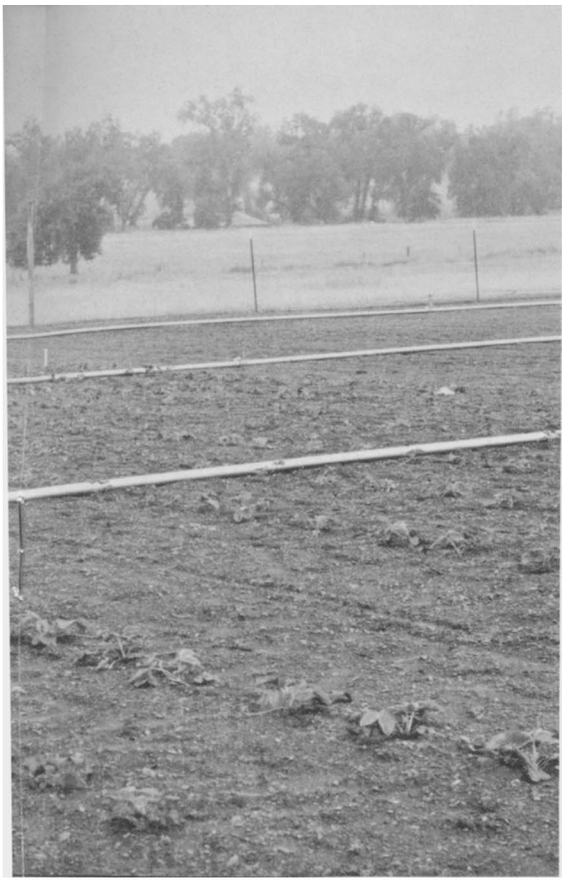
* Disease rating is number of infected leaves times percentage of leaf surface infected—smaller numbers indicate best control of powdery mildew.

Strawberries derived from the heat-treated, foundation

MERISTEM

A young strawberry plant growing on a filter paper bridge within a culture tube.





d, meristem-cultured clones growing in the
›n nursery.

M CULTURE

for elimination of strawberry viruses

S. H. SMITH · R. E. HILTON
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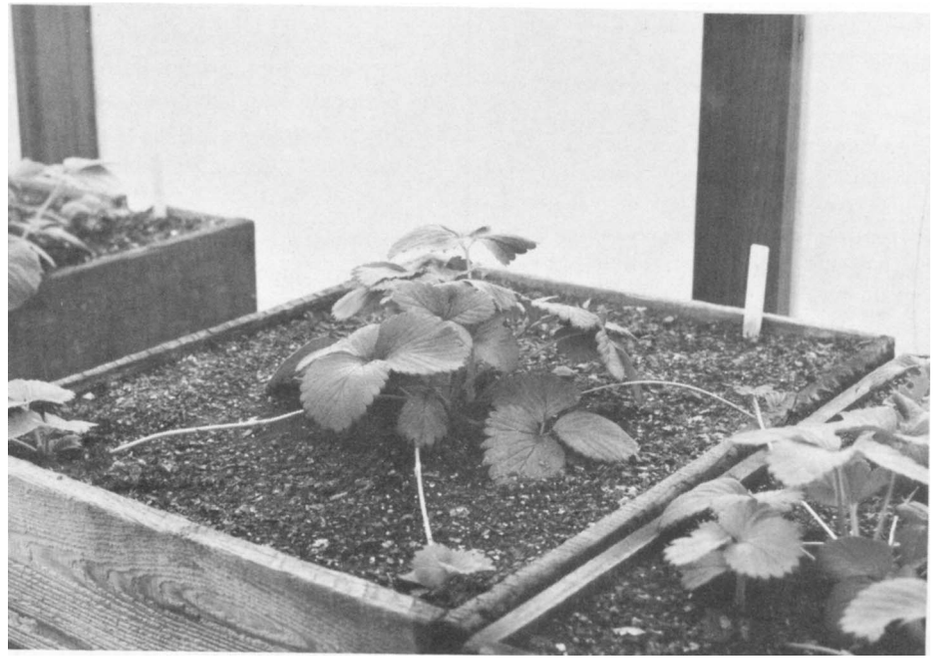
A program designed to rid strawberry varieties of viruses by meristem culture was initiated experimentally at U.C., Berkeley about three years ago. Some strawberry virus diseases can be controlled by prolonged heat treatment of the infected plants, however, there are other virus diseases that can not be eliminated by heat treatment. Meristem culture offers a means to control these heat-tolerant viruses. The meristems, or growing points, are small localized regions of active cell division. In meristem culture, these cells differentiate to form another strawberry plant. Approximately 70 per cent of the strawberry plants grown from individual meristems have been freed of all detectable viruses. This study has shown that a combination of both heat treatment and meristem culture is effective in eliminating viruses from strawberry plants.

IN THIS METHOD for control of strawberry viruses, plants known to be virus-infected are heat-treated at 104–106°F for four to six weeks. Following heat treatment, lateral and apical meristems about 0.02 of an inch (0.33mm) long are aseptically removed from the heat-treated plants and placed on filter-paper bridges in test tubes containing a nutrient medium. The first growth consists of an undifferentiated mass of cells around the base of the meristem. Cultures contaminated with fungi or bacteria are discarded. After four weeks, the minute pieces of tissue are transferred to a second nutrient medium containing hormones that induce the formation of roots and shoots (see photo). The developing plants remain on the second medium for one to six months. During this time the meristem grows to form a daughter plant that is transferred to soil known to be free of strawberry pathogens.

The meristem-cultured plants are isolated in screened cages in the greenhouse at Berkeley to minimize accidental contamination by insects. Once established, these plants are known as nuclear stock mother plants. Daughter plants are propagated from runners of these mother plants and the clones are individually indexed for virus. Any clone that indexes positive for virus is discarded. Then the virus-free daughter plants are shipped to Redding and transferred to individual boxes of fumigated soil on raised benches in a screenhouse (see photo). Each plant produces 50 to 100 new daughter plants by the end of the growing season. One daughter plant from every mother plant is indexed for virus as a further verification that the clones are virus free. No



A daughter plant of a virus-negative nuclear mother plant growing in the screenhouse at Redding, California.

virus spread has been detected in either the greenhouse or the screenhouse plantings during the last two years.

At the end of the growing period the plants are removed from the boxes and placed in cold storage. The following spring some of the plants are planted in the screenhouse and others are set out in field plots so the fruiting performance and vigor of each clone can be evaluated. This testing is being done at Salinas, Watsonville, and Santa Ana by R. S. Bringhurst (Pomology Department, University of California, Davis) and V. Voth (South Coast Field Station, Santa Ana). The remaining plants are available for planting in a foundation nursery—a plot of fumigated land well isolated from all other strawberry plants (photo). Data now available indicate that meristemed plants are superior in vegetative vigor to the noncertified commercial stock known to be carrying viruses. Yield comparisons are not yet available.

Certification

The foundation nursery is indexed by the California Department of Agriculture Nursery Service. If the foundation nursery meets the requirements of the Regulations for California Certified Strawberry Plants, the plants from the nursery are accepted into the Certification Program for increase and distribution to growers. To date, one meristemed variety, Fresno, has been certified by the California Department of Agriculture to be free of viruses. (A minimum of two years is required from the time a meristem variety is certified until it can be available to growers.)

Commercial strawberry plants are the main source of virus inoculum for infecting clean stock. When varieties are interplanted, viruses spread from infected plants to noninfected plants. With the increasing trend toward the annual planting systems and the introduction of clean stock of all varieties, losses due to virus can be minimized.

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IRRIGATION *and production on the San*

In processed tomatoes production of ripe fruit was significantly affected by irrigation schedules. Within the range of the test treatments, the longer the period between irrigations, the higher the percentage of ripe fruit and of solids. However, there was a highly significant reduction in yield and an increase in the amount of sunburn as the irrigation interval increased from 10 to 15 and 20 days. The 10-day irrigation cycle appeared to be the most suitable practice, yielding the highest tomato tonnage per acre, and consistent with the evapotranspiration and the gypsum block records. Longer irrigation frequencies depressed yield, stressed the tomato plants, and increased the percentage of sunburned fruits. Pre-irrigation is a very important practice in the production of tomatoes on the west side of the San Joaquin Valley.

IRRIGATION IS CONSIDERED to be one of the most important practices affecting tomato production on the west side of the San Joaquin Valley. Previous studies have shown that highest yields were obtained when varieties of processing tomatoes were irrigated when the soil dryness at the 18-inch depth did not exceed 1 bar suction. When such irrigation programs were used higher tonnages of solids per acre were obtained. Since most tomato growers in the San Joaquin Valley irrigate by schedule rather than by instruments, this study was based on schedule and evaluated by the use of soil moisture instruments. The objectives of this study were to evaluate the different irrigation schedules and to determine the effect of these schedules on tomato production.

Test procedures

Process tomato variety VF-145-21-4 was seeded March 10 in double row beds. The beds were 60 inches apart and 1,200 ft long. The soil was Oxalis silty clay, and was relatively uniform to about 4 ft.

Six irrigation treatments were replicated four times in a randomized block design. The treatments consisted of three irrigating frequencies, at every 10, 15, and 20 days; and two durations of application, 12 and 24 hours to each frequency. The treatments are referred to as short and long -wet, -medium and -dry, respectively.

The water was pumped from the San Luis Canal and siphoned from a head ditch to the field furrows. From October, 1968 to April, 1969 over 14 inches of rain fell in the area and in April the soil profile was wet down to 5 ft. Gypsum blocks were installed at 18-, 30- and 60-inch depths to indicate moisture extraction and depth of water penetration. Thinning was done during the last week of May. Before thinning, the field was sprinkled with 2.4 inches of water and after thinning all the treatments were irrigated with 2.44 inches of furrow irrigated water.

The plots were harvested July 31, 1969 with mechanical harvesters and the crop was graded and weighed the same day.

Yields

The wet treatments, irrigated either for long or short durations, produced the highest yield (table 1). Although the long duration treatment produced a higher yield than the short duration, the yield difference was not significant.