The data in table 7 was collected in 1972. In this case, very poor drying conditions existed due to a heavy rainfall two days after the fruit was laid on the tray. Raisin samples were collected from well drained areas of the tray (labelled HIGH) and from poorly drained areas of the tray (labelled LOW).

Several conclusions can be drawn from the data in table 7. First, adverse weather conditions early in the drying period can result in considerable mold growth. However, the mold percentage in those samples which were harvested from severed canes was generally significantly lower than in the fruit from untreated vines, irrespective of whether the samples were drawn from well-drained or poorly-drained areas of the tray. Secondly, the mold percentage in those samples drawn from well drained areas of the tray was significantly less than for samples from poorly drained areas. Thirdly, the mold percentage in samples drawn from well drained areas of the tray and also from cane-severed fruit was comparable with that found in hand harvested samples collected from the same vineyard. Consequently, the data suggest that use of a sloped tray is highly desirable to minimize mold development and that cane severing is definitely advantageous in limiting mold development under adverse drying conditions.

Flavor

Raisin samples from cane-severed plots and check plots were evaluated for flavor by USDA during normal incoming inspection. The samples were judged as exhibiting either a typical, or a non-typical, sun-dried flavor. The results of these judgments are shown in table 8. Considering those samples from the check vines, 75% were judged to have a non-typical flavor whereas only 12% of the samples from cane severed vines were so judged. Consequently, it appears that cane severing does promote the development of the characteristic flavor of California sun-dried raisins.

The data collected from machine-harvested plots indicate that cane severance is a desirable operation, and can result in a reduction of mechanical damage, mold infection, embedded leaf fragments and stickiness of machine-harvested raisins.

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SYSTEMIC INSECTICIDES *for control of* CITRUS MEALYBUG *in* GARDENIAS

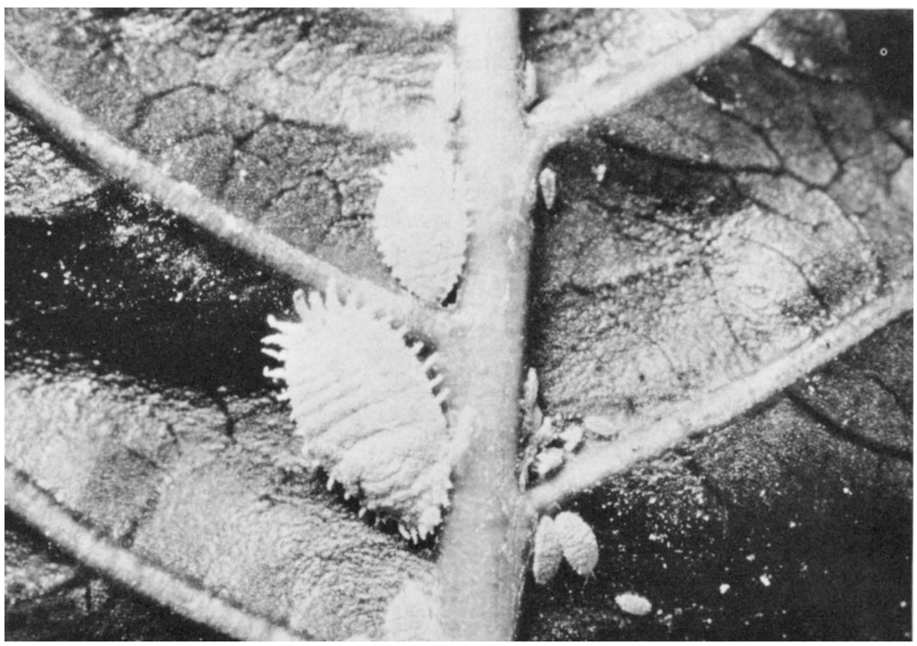
J. L. BIVINS · A. S. DEAL

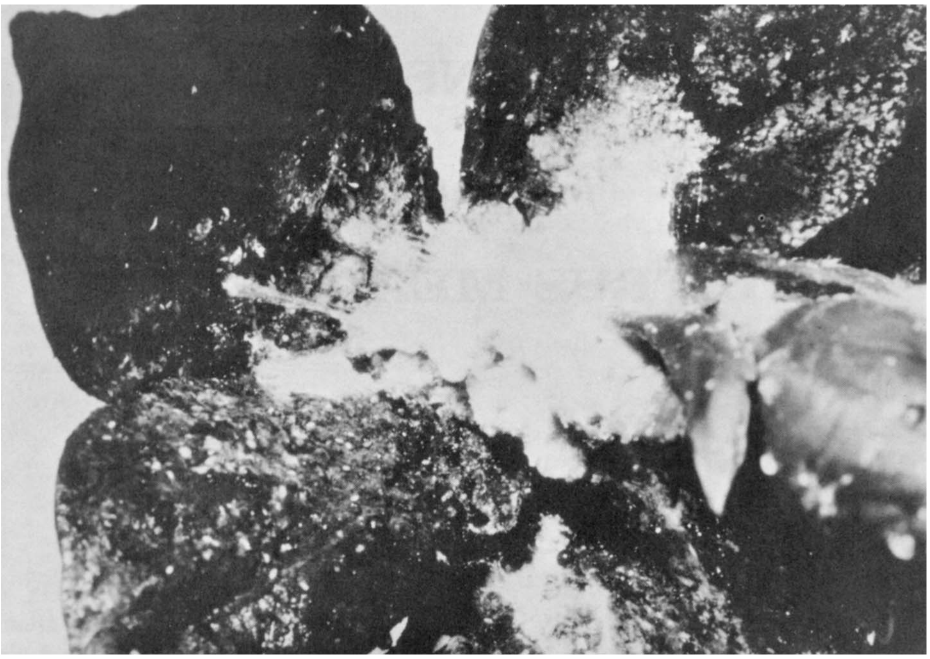
CITRUS MEALYBUG *Planococcus citri* (Risso) is a serious pest attacking many greenhouse grown crops. Cottony masses of the insect occur in great numbers on the growing tips of the branches of plants (see photo). The greatest numbers occur in the summer, fall, and early winter months, causing the most serious damage to plants. The mealybug is a gregarious feeder ultimately killing the tender shoots.

A number of natural enemies have been successfully introduced that are important in keeping the citrus mealybug in check. Among these, the two species most frequently used are *Leptomastidea abnormis* (Girault) and the beetle *Cryptolaemus montrouzieri* Muls. However, the parasites and predators are not always available. Occasionally, it is impossible to colonize them in sufficient numbers to contain the infestation of citrus mealybugs. Where biological control fails, the only suitable alternative has been chemical control.

In the past, sulfotepp was widely recommended and used for citrus mealybug control in greenhouses. Recently, other organophosphate materials—malathion and diazinon—have been used to control citrus mealybug. Interest has also been stimulated in the new systemics, utilizing more effective, highly-specialized

Citrus mealybug on a leaf of Mystery gardenia.





Cottony masses of insects appear when citrus mealybug infestation occurs in large numbers.

molecules that can be absorbed by plant roots and which travel and collect inside the plant to kill when the insects feed. One of the objectives of this research was to evaluate the effectiveness of several systemic insecticides for control of sucking insects.

Evaluations of insecticidal activity were made on green-house-grown Mystery gardenia planted in 5-gallon egg cans in a soil mix consisting of 1/3 redwood sawdust, 1/3 German peat and 1/3 yellow sand. The plants were hand watered and fertilized through a common garden hose. Each plot consisted of one plant in an individual egg can selected for infestation of citrus mealybug. Treatments were replicated four times and randomized in a complete block design. The insecticides—Cygon (dimethoate) and Meta-Systox-R (oxydemetonmethyl)—were formulated as emulsifiable concentrates, and applied as drenches in 2500 ml (84.5 fl. oz) of water per plot.

The insecticide, Temik (aldicarb) formulated as a granular concentrate, was applied dry and immediately drenched with 2500 ml of water per plot. All treatments were applied on January 14, 1972. Insecticides, formulations, and rates of application are shown in table 1:

Insecticide activity was evaluated February 16, April 7, May 24, and June 26, 1972. Total number of growth terminals per plant were counted February 16 and April 7, 1972 and the number of terminals with live colonies established was recorded. Ten randomly selected terminals were inspected May 24 and June 26, 1972 to determine if live colonies were present. The inspection of growth terminals was made with the aid of a 20-power hand lens.

No injury or other change in appearance of the gardenias was observed in any of the treatments. During the experiment, the plants were maintained in good growing condition with applications of water and fertilizer.

Results of insecticide evaluations for mealybug control are presented in table 2. These data show that of the insecticides tested, Temik was most effective in controlling citrus mealybug.

Counts made five months after treatment (table 2) show that Temik was effective in controlling citrus mealybug for half of the growing season. These data indicate that two treatments a year will be necessary to obtain complete control of the insects. Of even greater interest, however, are the counts made June 26 (table 2) which indicate that Temik exerted a surprisingly long control effect in an area of relatively high citrus mealybug infestation. The plants were very close together and ample opportunity was afforded for insects to move to adjacent plants.

Cygon did not give satisfactory control for more than three months following treatment (table 1) and citrus mealybug populations in Meta-Systox-R-treated plots were not different from those in untreated plots (table 2). A predator, the ladybird beetle, *Cryptolaemus montrouzieri* Muls, was released in the greenhouse in September and again in December 1971. No evidence of predation was observed among the citrus mealybugs. There were many mummified aphids on the check plants.

Temik is presently registered for use on chrysanthemums, cymbidium orchids, easter lilies, poinsettia, gerbera, carnations, roses and snapdragons in plant beds or potted plants in commercial greenhouses. It is registered for field grown and nursery plantings of roses, dahlias, lilies bulbs, birch and holly.

The University of California cannot recommend Temik on greenhouse gardenia until further research data is available and the insecticide is registered for this use.

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TABLE 1. INSECTICIDES, FORMULATIONS, AND RATES OF APPLICATION ON GREENHOUSE GROWN MYSTERY GARDENIA, JANUARY 14, 1972

Treatment	Chemical and concentration	Rate/gal H_2O	Rate/plant container
1	Cygon 2 lb/gal	0.75 tsp	2500 ml
2	Cygon 2 lb/gal	1.5 tsp	2500 ml
3	Meta-Systox-R 2 lb/gal	0.75 tsp	2500 ml
4	Meta-Systox-R 2 lb/gal	1.5 tsp	2500 ml
5	Temik 10% granular	—	0.5 tsp
6	Temik 10% granular	—	1.0 tsp
7	Control	—	—

TABLE 2. EFFECTIVENESS OF THREE INSECTICIDES ON MEALYBUG CONTROL ON GREENHOUSE GROWN MYSTERY GARDENIA, FOUR EVALUATION DATES

Treatment	Chemical and concentration	Infested growth terminals			
		2/16/72	4/7/72	5/24/72	6/26/72
		%	%	%	%
1	Cygon 2 lb/gal	0.0	0.6	75.0	100.0
2	Cygon 2 lb/gal	0.0	2.8	50.0	80.0
3	Meta-Systox-R 2 lb/gal	2.3	19.6	77.7	82.5
4	Meta-Systox-R 2 lb/gal	1.7	14.7	77.7	82.5
5	Temik 10% granular	0.0	0.0	0.0	40.0
6	Temik 10% granular	0.0	0.0	0.0	22.5
7	Control	3.9	20.0	75.0	100.0