

five compare average taste ratings with sugar-acid ratios for three seasons combined; 1967-68 is excluded as taste testing was not begun until 1968-69. Juice from Thermal and Lindcove reached acceptability about mid-November while juice from South Coast and Limoneira was not acceptable on the basis of this taste test until about the end of January. Although Thermal fruit showed a higher ratio of soluble solids to acid at all picking dates, it was not rated better by taste index than Lindcove fruit. This was probably due to the fact that desert grown

navels are low in both solids and acid, giving them a somewhat bland or flat flavor. Both solids and acid were considerably higher at Limoneira than at all other locations.

Total soluble solids, acid, and solids-acid ratio showed much less variation among seasons than among climatic zones; these data are given in table 2. Ascorbic acid (vitamin C) content in navel orange juice was higher in fruit grown at the coastal locations than in fruit grown at the interior locations at all samplings throughout the season. Graph

6 shows ascorbic acid results for 1970-71, the only season for which complete data covering all locations and sampling dates were available.

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NITROFEN HERBICIDE for control of Yellow Oxalis in greenhouse roses

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YELLOW OXALIS (*Oxalis corniculata*) is frequently a serious pest in greenhouse rose production. When steam fumigation precedes planting, the oxalis seedlings and plants are killed. However, due to the three to five year interval between steam treatments, when the roses are producing, reinfestation occurs by seed from adjacent beds. The seed is ejected from the seed pod with sufficient force to carry for several feet into previously clean beds. The seeds cling to clothing and often to animals, enabling them to be spread throughout the greenhouse and even to be introduced from the outside.

A preliminary study was started with the cooperation of Paul Nielson of Groen Rose Co., on March 4, 1971 to evaluate four herbicides, Nitrofen at 6 and 18 lbs active ingredient per acre, pebulate at 1 and 3 lbs, propachlor at 1 and 3 lbs, and chloramben at 6 and 18 lbs. The herbicides were sprayed over the soil surface, over new canes, and on lower leaves of the four-year-old, Happiness variety rose plants. The plots were immediately watered with an Ohio State watering system, applying 3 quarts of water per sq ft.

Observations made April 14, 1971 showed Nitrofen had killed established oxalis plants in the flowering and early seed pod stage and gave preemergence control. Pebulate controlled emerging seedlings but was ineffective against established oxalis plants. Propachlor and Chloramben did not control seedlings or established oxalis. None of the herbicides

evaluated caused visible symptoms of injury to the rose plants. On the basis of this preliminary study, a more extensive trial was established April 28, 1971 using two rates of Nitrofen at 3 and 9 lbs active ingredient per acre, replicated three times. Plots were 3 x 28 ft in ground beds with 8-inch concrete siding. Established four year old Happiness variety roses had been planted into a mix of redwood shavings and Baywood loamy sand soil in ground beds. A one-inch top dressing of redwood shavings was maintained around the plants. The herbicides were sprayed onto a solid stand of oxalis in early bloom and seed pod stage. All treatments were applied with a 2 gallon, X-Pert Hudson sprayer, equipped with an 8002 Tee-jet nozzle and immediately watered in with 3/4-inch per sq ft of water through an Ohio State sprinkler system.

Weed count and crop phytotoxicity ratings were taken at intervals after herbicide application (see table). Crop phytotoxicity ratings were made May 4, June 11, and August 20, 1971. Weed counts were made June 11 and August 20, 1971.

When evaluated 44 days after treatment, Nitrofen at 3 lbs-active ingredients per acre killed about 50% of the mature yellow oxalis plants. At 9 lbs, over 95% control was achieved. Four months following the treatment, Nitrofen at 3 lbs was not effectively controlling oxalis, however the 9-lb rate continued to control better than 98% of the germinating seed. Observations made as early as one week following treatment showed that mature oxalis plants were affected by the herbicide. No visible symptoms of damage to

mature or new rose canes were observed.

Effective *Oxalis corniculata* control of both mature plants and germinating seedlings was achieved with 9 lbs active ingredient per acre of Nitrofen for a four-month duration. At 3 lbs, partial control was achieved for 44 days, however, regrowth and new seedlings emerged by four months.

From the results of these experiments, Nitrofen appears to be a promising herbicide for pre- or postemergence control of *Oxalis corniculata*.

Nitrofen is most effective on weeds when applied preemergence or early post-emergence. If the herbicide is mixed into the soil it becomes ineffective. It is presently registered on several California crops and registration is pending on several ornamental crops.

The University of California cannot currently recommend Nitrofen on greenhouse roses until registration and further research on roses is available.

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AVERAGE OXALIS CORNICULATA PLANTS PER PLOT AND PER CENT CONTROL FROM SPRAYING HAPPINESS ROSES WITH TWO RATES OF NITROFEN

Herbicide Treatment	Rate	Mature plants (June 11, 1971)		New seedlings (August 20, 1971)	
		Avg plants per plot	Control %	Avg. plants per plot	Control %
Control	ai/A	no. 468	% -	no. 320	% -
Nitrofen	3	220	53.1	209	34.7
Nitrofen	9	20	95.8	6	98.2