Coast redwood excavated about 6 inches to expose basal sprouts. The sprouts to the left of the pencil were cut close, those to the right were headed near original ground level. Left, unsprayed tree; right, tree base sprayed with NAA on May 28. Photo July 22, 1970.

# CONTROL OF TRUNK SPROUTS WITH GROWTH REGULATORS

R. W. HARRIS · R. M. SACHS · R. E. FISSELL

**Regrowth of trunk sprouts on eight of nine species treated with growth regulators was reduced by 85 per cent, as compared with untreated trees in these tests. The sprouts that did grow on treated trunks were only one-tenth to one-third as long as sprouts from untreated trunks. There was very little translocation of the growth regulators from the regions of application.**

SPROUTS ON THE TRUNKS of trees are a nuisance to nurserymen, fruit growers, landscape horticulturists and gardeners. Although shoots of low vigor along the trunks of young trees shade and speed the development of trunks, vigorous, unwanted sprouts can be extremely troublesome. Pruning such sprouts from the trunk and roots does not eliminate the problem with a number of species. In fact, the removal of one vigorous sprout may encourage the development of several, particularly if the original sprout is not pruned close to the trunk. Chemical inhibition of trunk sprouting offers the possibility of minimizing this problem and tests reported here were set up to evaluate materials.

Mature plants of nine species of trees and shrubs were selected on the Davis Campus for treatment (see table). Sprouting varies greatly between individuals of a species. Hence, to select uniform plants or treatment areas on the trunks, selections were made when new sprouts were 3 to 10 inches long. In most cases, all of the above-ground shoots were pruned as close to the trunk as possible.

INFLUENCE OF SEVERAL CHEMICALS ON REDUCING TRUNK SPROUTING OF NINE TREE AND SHRUB SPECIES; DAVIS, 1970

| Species | Date treated | Resprouts as percentage of unsprayed* | | | | |
|---|---|---|---|---|---|---|
| | | NAA | | 2,4,5-T | | Picloram |
| | | 0.5% | 1.0% | 0.5% | 1.0% | 0.2% |
| **Coast redwood** Sequoia sempervirens | 5/28 | – | 2[b] | – | 28[b] | – |
| **Eucalyptus** E. camaldulensis E. viminalis | 5/28 | – | 6[b] | – | 15[b] | – |
| **Evergreen pear** Pyrus kawakamii | 3/21 | – | 0[b] | – | 34[a] | – |
| **Flowering crabapple** Malus floribunda | 5/29 | 19[a] | 92[a] | 32[a] | 92[a] | – |
| **No. Cal. black walnut** Juglans hindsii | 3/13 | 35[a] | 13[b] | 14[b] | 14[b] | 6[b] |
| **Olive** Olea europea | 3/7 | 33[b] | 38[b] | 23[b] | 18[b] | – |
| **Crape myrtle** Lagerstroemia indica | 3/24 | 4[b] | – | 0[b] | – | 29[a] |
| **Oleander†** Nerium oleander | 6/3 | 4[b] | 7[b] | 2[b] | 1[b] | 2[b] |

* Treatment percentages with 'a' are not significantly different from the check; those percentages with 'b' are significantly different from the check, at least at the 5% level of confidence.

† Pruned and sprayed March 23 with concentrations indicated above without any noticeable effect. Resprouts were removed on 6/3 and resprayed with the same materials at 4 and 8 times the lower concentration of each.

Crape myrtle, all branches except one headed to within 18 inches of the ground, the lower 2 feet sprayed May 22. Left to right: 2,4,5-T, X-77 spreader (check), NAA, and 2-4-D, Davis, June 20, 1969.

On the redwood and crabapple, some of the sprouts were pruned off close and others were left 2 to 4 inches long. The crape myrtle and oleander, which were growing as shrubs with 5 to 8 multiple stems, were pruned to leave one central trunk by heading the others to within 18 inches of the ground (see photo).

### Materials tested

Naphthalene acetic acid (NAA) and 2,4,5-trichlorophenoxy acetic acid (2,4,5-T) were tested in 1969 and 1970. Maleic hydrazide (MH) and 2,4-dichlorophenoxy acetic acid (2,4-D) were tested only in 1969 and picloram only in 1970. The concentrations varied from 0.2% to 3.6% but most were at 1.0%. Aqueous solutions were prepared with X-77 or Nufilm as the spreader. The area from which the sprouts had been removed was sprayed to run-off using a small hand-pumped atomizer. None of the material was sprayed on leaves or fruit.

### Reduced resprouts

NAA and 2,4,5-T reduced the percentage of resprouts on the trunks treated (see table and photos). Picloram and 2,4-D reduced the resprouts on black walnut quite effectively, but MH resulted in no effect on the two species treated (black walnut and olive). Control of trunk sprouts was variable between trees on treated areas, but there were several cases in which complete control was accomplished, as shown in photos. The sprouts that did grow from the treated areas, were only one-tenth to one-third as long as those from the untreated plants. Crabapple responded erratically, with the lower concentrations most effective, though not significantly so.

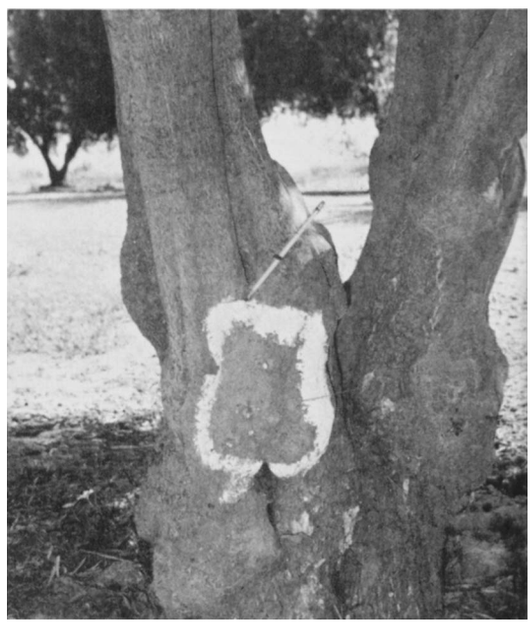
Of the trees sprayed in 1969, resprouting in 1970 was reduced to about half that of the checks on olive and crape myrtle. However, NAA and 2,4,5-T appeared to have little carry-over effect on black walnut. The crape myrtle and oleander were growing as shrubs and were severely pruned to one stem. The entire base of each plant was sprayed.

Sprout control on crape myrtle was good both years, but the same materials at the same concentrations were without effect on oleander in 1970. The resprouts from the March 23 treatments were removed from all the oleanders on June 2 and half of the plants in each treatment were resprayed with concentrations four times the previous amounts. Sprout control was good with all three materials: NAA, 2,4,5-T and picloram. Some bark swelling occurred at the 1.6% concentration of picloram.

Pruning close to the trunk in sprout removal was important in reducing resprouting in redwood (see photo). Sprouts, particularly those originating below the soil surface, are difficult to remove, so stubs are often left. The redwood trunks were excavated 4 to 6 inches to expose the base of all sprouts. Those on one side of each tree were pruned close; those on the other were headed at the original ground level. Pruning close reduced the number of pruning wounds since a number of sprouts were low branched. On the close-cut wounds, only 20% resprouted, while on the stubs there were nearly two sprouts for each stub. The 1.0% NAA reduced the redwood resprouts to less than 5% on those stubbed, as well as those cut close. On redwood, 2,4,5-T appeared not to be as effective as NAA.

Even though the chemicals were applied at high concentrations, there appeared to be little translocation. On black walnut, olive and eucalyptus,

Olive, all sprouts removed on March 7. Above, untreated tree; below, sprayed with 0.5% 2,4,5-T on March 7. Photo July 22, 1970.



treated areas were close to untreated areas on the same trunks. On many trees, treated areas had almost complete suppression of sprouts while nearby untreated areas resprouted profusely (see photo). Only the picloram caused any leaf distortion of sprouts growing from treated areas.

Leaves and developing shoots in the tops of the trees, or on unsprayed areas of the trunks, showed no signs of hormone response or injury. Leaves and fruit from the olive and walnut trees, and leaves from the crape myrtle, were collected in mid-August, 1969, for residue analyses. Only 0.02 ppm (parts per million) of 2,4,5-T was found in the crape myrtle leaves. The allowed residue on crop plants for 2,4,5-T is 25 to 250 times greater. In walnut and crape myrtle, less than 0.02 ppm 2,4-D (which is the limit of the sensitivity of the analysis) was found. NAA analyses were not done because of the need for more sensitive procedures. Analyses to determine NAA residues in fruit will be performed on olive, and filbert from trees treated in 1971 with 1% NAA to control sprout development. Recently developed procedures for NAA are sensitive to 10 parts per billion.

The pruning wounds began to heal about the same regardless of the treatment, except for picloram on oleander and 2,4,5-T on crape myrtle. Around the pruning wounds of these species the bark was swollen and resembled crown-gall tissue.

Northern California black walnut, sprouts pruned off trunk on March 13. Area in white rectangle sprayed with 1.0% NAA same day. Photo July 22, 1970. NAA had no effect on sprouting from untreated area on left.

Dormant applications to trees did not appear to be as effective in reducing sprouting as sprays applied after growth had begun. In both cases, shoots and leaves were removed from the treated areas. No recommendations can be made for these chemicals for sprout control on tree trunks pending registration for such use.

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# CONTROL OF TREE ROOTS IN SEWERS AND DRAINS

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**Although tree roots in sewers and drains cause losses of millions of dollars each year in the U. S., there has been very little research on control methods. This is a report of 2½ years of chemical control tests in cooperation with the Sacramento County Department of Public Works. Two chemicals—metham (Vapam), and dichlobenil (Carsoron)—used alone, or in combination, killed roots in sewer pipes in one-hour-long treatments by soaking.**

THIS REPORT involves studies of tests with chemicals for control of tree roots in sewers and drains conducted at Davis in a lathhouse and field work in problem areas of Sacramento County.

Plants used in lathhouse trials at Davis included eucalyptus, willow, grape, prune, peach, and cotton. The small trees were grown in plastic pots with holes punched in the bottoms. These pots were placed on top of other pots that were partially filled with sand or vermiculite. After the roots had developed extensively in the lower pots (three to 12 months), the lower roots were separated from the vermiculite and returned to these pots for a week or longer. Treatment was then made by soaking all except the upper 5 cm in the treatment solution, usually for one hour. The roots were allowed to drain before replacing the plants on the lower pots. In some experiments, the roots were sprayed rather than soaked. After returning the plants to the original pot assemblies, notations of injury to the roots and shoots were made periodically. The plants were broken out of the upper plastic pots after six to 10 weeks, and the entire root systems and stems were examined for browning and death of tissue.