Stems larger than 2 inches in diameter should be chopped through the bark near the base to facilitate penetration. Although the esters are superior to the oil-soluble amines, the latter should be used when fumes from esters might damage other plants. Applications in the winter or spring give best results.

Cut-surface treatment

The cut-surface method is effective, but it is of limited usefulness near the home where dead trees would be unsightly. Cuts should be made near the ground with a heavy hatchet or axe, through the bark, well into the wood and continuous around the tree. Cuts should be filled with undiluted water-soluble 2,4-D amine. If Ammate is used, cuts must be larger to hold an appreciable quantity of the dry salt. Applications made in the winter and spring give the best results.

Injury to near-by trees of the same species is not common but has been observed. This injury may occur because of root grafts which allow the chemical to pass from one plant to the next.

Stump control

Stumps may be sprayed with the basal spray mixtures already described. Tops and sides of stumps should be covered thoroughly with the spray as well as all sprouts that might be present. Effectiveness is increased by cutting into larger stumps near the base. Control is best when stumps are treated immediately after cutting.

Freshly cut stumps may be treated with 2,4-D water-soluble amine applied liberally to the tops of the stumps, and especially to the sapwood. Winter is the best season for making this treatment. Control is much more effective when the stumps are cut close to the ground. A similar chemical, water-soluble 2,4,5-T amine, is slightly more effective than the 2,4-D amine for controlling sprouting on some stumps but it is more expensive. Ammate crystals placed on top of the stumps can also be used to control sprouting.

Soil applications

Fumigants are useful for killing woody plants when the number to be treated is limited. One-half cup of soil fumigant is poured or injected into holes 6 inches deep and spaced about 6 inches apart around the base of the bush or tree. Killing is most rapid during the period of active growth. Tests have demonstrated the effectiveness of fumigants against poison oak, blue oak, live oak, walnut, and the St. George Rupestris grape rootstock. Roots are normally killed about 10 inches from the point of application but occasionally roots have been killed as far as 30 inches away. The killing action of fumigants is similar to pruning.

Fenuron pellets have only a limited usefulness near the home. Applications should be made at the very base of the stems from November through January. The dosage required to effect control is variable, depending upon soil type and plant species. One ounce may be enough to kill a small bush but a large clump of live oak may require as much as a pound. Fenuron may wash off and kill grass. It will induce chlorosis on shrubs or trees having roots beneath the point of treatment and injury may result. Application is quite easy and in many cases no retreatment is needed. Chemical costs are probably greater than for the other chemicals discussed.

Precautions

Both 2,4-D and 2,4,5-T can damage surrounding plants due to drifting of the spray. Considerable care is necessary in making applications. A use permit from the County Agricultural Commissioner is required to purchase more than one-half pound of actual chemical within a 24-hour period. The spray equipment used in applying these materials is difficult to clean with certainty; therefore, it is safer not to use such equipment for applying insecticides or other chemicals that might be used on plants. Ammate is quite corrosive, so spray equipment should be washed immediately after use. Fumigants should be kept off the skin and not spilled onto the shoes.

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Carob Tree Stimulated Gibberellin

— *Salable nursery produced in less*

SLOW STEM elongation and the excessive time required for production of a salable plant have been problems with a number of nursery plants including the carob tree (*Ceratonia siliqua*). Aqueous spray applications of potassium gibberellate concentrations made at specific intervals, over a 20-week-treatment period, offer the possibility of producing salable plants more rapidly than would be possible under ordinary nursery management practices.

Two-month-old carob seedlings were planted in 1-gallon cans and treatments were begun out of doors in mid-October. Eight separate randomized treatments of five replications and five plants per replicate were used, as listed in the table. The foliage of each plant received approximately 5 ml of solution at each time of application.

Observations were made weekly on total stem elongation. At the end of 20 weeks, the treatments were discontinued and the plants were allowed to grow for an additional 10 weeks to determine their post-treatment response. At this time, total elongation, number of nodes, and number of leaflets were recorded.

Table

The table shows that shoot elongation was generally proportional to the concentration of gibberellin applied. Also, the number of leaflets produced and number of nodes produced were significantly greater in most gibberellin treatments.

Graph

The graph shows that the 50-1T/M treatment (50 milligrams per liter applied

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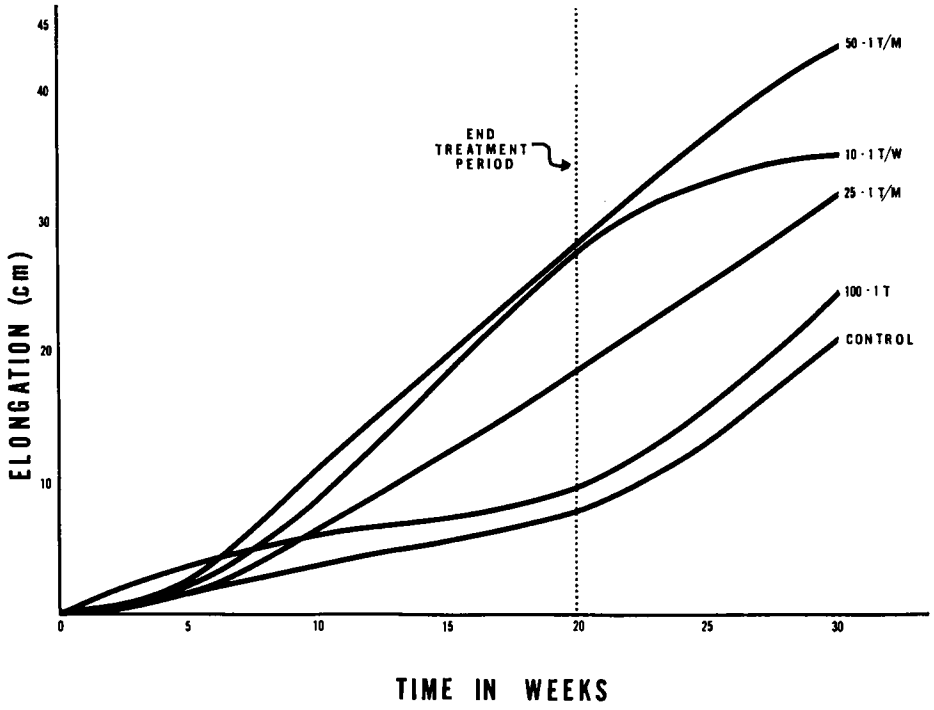
Growth with *plants time*

Representative plants at the 30 week observation date. No label—Control, A—100-1T, B—25-1T/M, C—25-2T/M, D—10-2T/M, E—10-1T/W.



Graph to left illustrates shoot elongation over 30 week period with four gibberellin treatments compared to control. Table below details significance of treatments.

one time per month) or the 25-2T/M treatment produced almost a linear elongation with time which exceeded the other treatments. The 10-1T/W treatment (10 mg/l applied one time weekly) approached these concentrations at 20 weeks, but fell off rapidly when treatment ceased. Such frequent treatments caused the plants to become weak and spindly, and eventually to die back prior to the 30-week observation. This caused lateral branching and reduced the total height, producing more variability within the treatment. Of 25 plants treated with 10-1T/W, 15 were definitely abnormal and 3 were dead at the 30-week observation period. Note that the slope of the curve approaches a constant after the treatment period (except for the 10-1T/W treatment). Preliminary results with *Brunfelsia calycina*, var. macrantha (*B. lindeniana*) indicated that it was also responsive to similar concentrations of potassium gibberellate. Further testing may reveal similar results for other slow-growing species.

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Treatment	Total concentration	Treatment symbol	No. of leaflets	No. of nodes	Increase in Ht. (cm) at 20 wks.	Increase in Ht. (cm) at 30 wks.
100 mg/l—one time only	100 mg/l	100-1T	50.88	16.04	9.64	25.08
50 mg/l—one time only	50 mg/l	50-1T	46.48	15.80	8.08	21.44
50 mg/l—one time/month	250 mg/l	50-1T/M	61.84**	18.48**	27.92**	43.68**
25 mg/l—two times/month	250 mg/l	25-2T/M	57.32*	18.16**	28.60**	42.92**
25 mg/l—one time/month	125 mg/l	25-1T/M	55.40*	17.20*	18.20**	32.36**
10 mg/l—two times/month	100 mg/l	10-2T/M	59.60**	18.52**	19.84**	36.88**
10 mg/l—one time/week	200 mg/l	10-1T/W	51.50	16.95	28.27**	38.55**
Control	0	Control	43.76	15.08	7.88	21.12

* Significant at 5% level.
** Significant at 1% level.