

Growth control of laurel fig with chlorflurenol

Henry Hield □ Stuart Hemstreet

Chemical banding maintains desirable appearance with two-thirds less pruning.

The laurel fig, *Ficus nitida* Thunb., has been planted extensively as a street tree in southern California. Under ideal growth conditions, this tree may eventually reach heights of 30 feet and, as with many street trees, periodic pruning is required to provide clearance for pedestrian and vehicular traffic. Laurel fig is generally pruned on cycles of one to three years.

Foliar growth-inhibitor sprays of 0.1 percent malic hydrazide (MH), 0.075 percent chlorflurenol, or 0.4 percent dikegulac (Atrinal) effectively reduce shoot growth for up to four months, but the hazard of spray drift to other vegetation prevents the use of such sprays in many urban situations. Trunk injection of chemicals for growth control is not effective for *Ficus*, possibly because of its latex content. For these reasons, we have investigated trunk banding, using chlorflurenol from the product Maintain CF125, to observe its effects on growth control (to reduce pruning frequency) and possible maintenance cost reductions. Bark banding of plant growth regulators has been found effective only with oil-soluble chemicals applied in oil-base

carriers. Maintain CF125 was the only commercially available product that met this requirement.

Treatment procedure

Band width is determined by multiplying the trunk diameter, as an index of tree size, by a predetermined factor that characterizes the species' responsiveness to the chemical. The species factor for laurel fig is 4. The solution of 1 percent chlorflurenol in a carrier of 30 percent toluene and 70 percent diesel oil is applied by 3-gallon sprayer or paintbrush to wet the bark. Application should begin at the top edge of the area to be banded to allow for downward flow of the solution, and should be completed without excessive wetting below the band.

Chlorflurenol results in greater growth reduction in pruned than in unpruned trees. Before treating severely pruned trees, where most of the canopy has been removed, they should be allowed to regrow foliage to a visually acceptable level.

Treatments are reapplied when vigorous regrowth indicates that shoot growth inhibi-



Laurel fig trees in Riverside with large rounded canopies, banded in 1979 and 1980 (at right), had an acceptable appearance and reduced shoot growth through early May 1980.



In the city of Orange, trees grown in a high hedge that had to be pruned yearly required significantly less pruning after repeated banding treatments (left and center) than did the control at right.

tion is diminishing. The chemical also slightly increases the rate of aging and drop of mature leaves. When the canopy becomes somewhat open, so that occasional small openings can be seen from below, treatments are discontinued. The cycle is resumed after a period of regrowth followed by pruning.

Examples of responses

In a 1978 test, large standard-size trees were pruned on February 10, banded with 1 percent chlorflurenol on April 11, and pruned again on November 7. In one growing season, banding significantly reduced shoot length and pruning weight in both the 2-diam and 4-diam band-width treatments. Shoot growth, 182 days after banding, was 72 cm in untreated controls, 28 cm in 2-diam treatments, and 20 cm in 4-diam treatments; pruning weights were 18.6, 11.7, and 7.1 kg per tree, respectively, 201 days after treat-

ment. Pruning time was reduced only with the 4-diam band (to 6.4 minutes per tree, compared with 11.7 for the control). Both bandings resulted in smaller leaves, and the 4-diam application decreased canopy density.

Street trees with large rounded canopies in Riverside, which were banded in 1979 and 1980, had an acceptable appearance and reduced shoot growth through May 7, 1980 (table 1). With no treatment after February 4, 1980, the pruning on October 6, 1980, showed a 69 percent reduction for pruning weight but no significant difference for a 29 percent reduction in pruning time.

In the city of Orange, laurel figs grown in a high hedge that required yearly pruning were treated by trunk banding from 1978 through 1981 (table 2). Pruning results in 1978 showed no differences after one treatment (the 11/3/78 application being too recent to give a response on 11/15/78). However, in 1979 and

1981, following repeat applications, foliage removed and pruning time were significantly lower than in controls.

Unpruned trees were treated on August 15, 1979, March 20, 1980, and November 19, 1980. Growth was evaluated by measuring different shoots marked at each treatment date. A consistent level of shoot growth reduction was found with the 4-diam band width. Tree heights determined on October 20, 1981, were not different. Application of the 1 percent chlorflurenol-carrier mixture over gauze, which was then covered with plastic wrap, increased the growth control with a smaller band width. However, covering the band can also result in trunk injury, and it is not advised.

Incidence of Cuban laurel thrip, *Gynaikothrips ficorum* Marchal, has decreased on chlorflurenol-treated trees. Trees 4-diam-banded on March 27, 1980, were rated for thrip leaf damage on August 5, 1980, on a scale of 1 (showing no injury) and 10 (showing severe thrip damage). Treated trees averaged 2.2; untreated trees averaged 7.7.

Root growth has not been measured on field-grown laurel fig. Measurements on other tree species in the field suggest that root growth is reduced by a similar magnitude as top growth.

Summary

Where foliar sprays are impractical, chlorflurenol trunk banding of laurel fig offers a means of lengthening the pruning cycle. If we disregard the one-time banding of the trees pruned in November 1978, the measurements after repeated banding show that chlorflurenol caused reductions of 73 percent in shoot length, 67 percent in mass of prunings, and 43 percent in pruning time. A further uncalculated benefit is the time saved in not having to collect and dispose of the greater masses of clippings from untreated trees.

Trunk injury has not occurred from banding with 1 percent chlorflurenol in the 30 percent toluene, 70 percent diesel oil carrier. Tree appearance is slightly altered but has not been of public concern. The reduction in long vegetative shoots gives the canopy a more uniform surface appearance. The leaves are slightly smaller, lighter green when young, and have characteristics more similar to *Ficus retusa*. Chlorflurenol trunk banding is a registered application and is being used by some cities on their street trees.

TABLE 1. Responses of large, rounded laurel fig trees in Riverside to repeated chlorflurenol trunk banding

Response	Date treated	Date evaluated	Untreated control	1% chlorflurenol*	
				2-diam band	4-diam band
Leaf drop rating†	5/ 3/79	6/13/79	2.0	1.5	1.5
Leaf color rating‡		6/13/79	1.0	1.0	2.0
Growth control rating, %		6/13/79	0.0 a	50 ab	66 b
Growth control rating, %		7/12/79	0.0	34	50
Leaf drop rating†		7/12/79	1.0	1.0	1.5
Leaf color rating‡		7/12/79	1.0	1.0	1.5
	7/27/79				
Trunk ratings§	12/14/79	1/ 2/80	1.0	1.0	1.0
Branch shoot breaks, length, cm	2/ 4/80	2/ 4/80	77 b	43 ab	19 a
Branch shoot breaks, number		2/ 4/80	18	19	28
Canopy density, %		5/ 7/80	80 a	75 b	50 c
Growth reduction, %		5/ 7/80	28 a	48 b	57 c
Pruning time/tree, min		10/ 6/80	22.1	...	15.6
Weight prunings/tree, kg		10/ 6/80	91.3 a	...	28.1 b

*Means in each row followed by the same letter are not significantly different according to Duncan's multiple range test, P=0.05.

†Scale: 1 = no leaf drop, 5 = severe leaf drop.

‡Scale: 1 = green color, 5 = chlorosis.

§Scale: 1 = normal smooth, 5 = rough.

TABLE 2. Responses to repeated trunk banding of large laurel fig trees pruned yearly to square shape, Orange, California

Response	Date pruned	Date treated	Date evaluated	Untreated control	1% chlorflurenol*	
					2-diam band	4-diam band
	11/77	4/27/78				
	11/78	11/ 3/78	11/15/78†			
		4/ 9/79				
Shoot length, cm	11/79	10/ 3/79	11/27/79	92 b	28 a	12 a
Wt prunings/tree, kg			11/27/79	58 b	23 ab	7 a
Pruning time/tree, min			11/27/79	33.3 b	30.2 b	12 a
Growth reduction, %		3/13/80	6/ 6/80	0 a	40 b	43 b
		6/24/80	8/ 5/80	0 a	36 b	43 b
		9/30/80	9/30/80	0 a	36 b	49 b
		2/ 9/81	0 a	69 b	87 c	
Pruning time/tree, min	8/81	6/21/81	8/ 5/81	64.3 a	54.6 b	40.9 b
Clippings, 32-gal cans/tree			8/ 5/81	21 a	13 b	11 a

*Means in each row followed by the same letter are not significantly different according to Duncan's multiple range test, P=0.05.

†Pruning results in 1978 showed no significant differences.

Henry Hield is Specialist, and Stuart Hemstreet is Staff Research Associate, Department of Botany and Plant Sciences, University of California, Riverside.