

# TRUNK BARK BANDING WITH CHLORFLURENOL FOR GROWTH CONTROL<sup>1</sup>

by H. Hield

**Abstract.** Trunk bark banding has been performed with chlorflurenol (Maintain CF 125) at a 1% concentration in a carrier of 30% toluene and 70% No. 1 diesel oil. Band width, as related to trunk diam, was varied to allow adjustment of the amount of chemical applied. Band widths have been between 0.25 and 8.0 trunk diam equivalents according to species requirements. Results indicate that deciduous trees should not be banded in the late summer or fall when there is no longer shoot growth. The late season banding of deciduous trees resulted in deformities of the leaf blades of the following spring growth as well as a less dense canopy for as long as 4 months, after which time normal growth resumed. Young trees without mature bark characteristics have shown abnormalities of external trunk growth not found from banding over-mature bark of the same species. However, transverse cuts through the banded zones of young trees have shown no internal damage.

Bark banding is accomplished by a basal application of a solution in a complete band around the trunk. The growth inhibitor chlorflurenol (Maintain CF 125) has been used (see literature citations in 1) to reduce shoot growth in the tree top which would interfere with power distribution lines.

Application methods will be reviewed and certain procedures which have been standardized in California will be indicated. Additional information will be shown on timing of applications on deciduous trees, effectiveness for various tree species, certain responses related to tree age, and results from interior examination of trunks of trees following several years of repeated bark banding.

**Application Procedure.** The diam of the tree trunk is measured with either a large caliper or a direct converting circumference tape. A small mark is then placed on the trunk above the soil line at a distance equal to the tree diam. This area is then spray banded using a 3 gal. sprayer. The spray is applied just to wet, using low pressure and large droplet size, which minimizes drift. Where large surface roots occur they are not treated. The application may also be performed with a paint brush.

The banding is applied with relation to foliar growth to minimize leaf distortion from the chlorflurenol. Pines are treated when they are dormant and deciduous trees after they have leafed out in the spring but before the time of shoot elongation.

The supplemental label registration for California specifies that a 1% concentration of Maintain CF 125 be applied in a band equal to the diameter of the trunk. A choice of carrier systems is permitted but the carrier mixture of 30% toluene and 70% No. 1 diesel oil is preferred because of the stability of the mixture.

The label also specifies that young or weak trees not be treated. Our experience suggests that trees that have not developed mature bark characteristics should be considered young.

**Current Procedure.** A 1% concentration at a 1-diam band width is not appropriate for many trees. To adjust the amount of chemical applied, a 1% concentration is being used with band width varied (Tables 1 and 2).

**Table 1. Band widths of a 1% chlorflurenol solution causing acceptable top growth inhibition on various tree species.**

Species	Band width in trunk diam
<i>Acacia longifolia</i>	½-1
<i>Ceratonia Siliqua</i>	1
<i>Cupressus sempervirens</i>	½-1
<i>Eucalyptus Globulus</i>	6-8
<i>Eucalyptus sideroxylon</i>	< 2
<i>Fraxinus uhdei</i>	2
<i>Fraxinus velutina</i>	1-2
<i>Ficus nitida</i>	> 4
<i>Ficus macrophylla</i>	1-2
<i>Ficus elastica</i>	1
<i>Pinus radiata</i>	1
<i>Pinus canariensis</i>	1
<i>Pinus halipensis</i>	½-1
<i>Pinus sp.</i>	½
<i>Ulmus parvifolia</i>	1-2
<i>Ulmus pumila</i>	1
<i>Schinus Molle</i>	¼-½

<sup>1</sup>Presented at the annual meeting of The International Society of Arboriculture in Toronto, Ontario in August 1978.

**Table 2. Tree species not showing injury from a trunk bark banding of 1% chlorflurenol at a 1 diam band width one yr after treatment. Growth reduction not measured.**

Species <sup>1</sup>	
<i>Acer saccharinum</i>	<i>Liquidamber styracifolia</i>
<i>Ailanthus altissima</i>	<i>Magnolia grandiflora</i>
<i>Alnus rombifolia</i>	<i>Melaleuca</i> sp
<i>Callistemon rigidus</i>	<i>Morus alba</i>
<i>Catalpa bignonioides</i>	<i>Populus alba</i>
<i>Cinnamomum camphora</i>	<i>Quercus ilex</i>
<i>Casurina equisetifolia</i>	<i>Quercus suber</i>
<i>Cypress sempervirens</i>	<i>Robinia pseudoacacia</i>
<i>Eugenia unifolia</i>	<i>Salix discolor</i>
<i>Ginkgo biloba</i>	<i>Salix</i> sp.
<i>Ligustrum lucidum</i>	

<sup>1</sup>Many from observations of treatments by J. Shanahan, Los Angeles Power and Light.

Where the canopy is drastically smaller than would be expected for the trunk diam, the band width should be proportionally reduced. Thus, if the tree canopy is judged to be 50% smaller because of pruning or breakage, a ½ diam band should be considered where 1 diam has been otherwise shown effective for growth control.

The canopy density of a tree species is also a factor for consideration in banding treatments. A characteristic of chlorflurenol is to cause an increased rate of aging of leaves and bark. Thus, it may be expected that older leaves on a treated tree may senesce sooner. Should the tree species characteristically have an open canopy, an increase in leaf drop coupled with a growth reduction could result in an undesirable appearance from lack of sufficient foliage. In contrast, trees with dense canopies are usually more acceptable in appearance should some leaf drop occur.

Summer and fall applications have been tested since it is impractical to treat all deciduous trees early in the spring. When other factors were considered, early summer applications have been successful. However, applications toward the end of the growing season have demonstrated that there should be a cut off of applications before the start of winter dormancy. *Ulmus parvifolia* banded at 1 diam on 10-25-77, when it was still actively growing, showed a slight growth reduction, normal leaf appearance and an acceptable canopy development when spring growth was measured on 4-13-78 (Table 3). A 2-diam band at the same

date resulted in less spring shoot elongation, had smaller leaf size and was marginal on canopy density acceptance. The 1-diam band on 11-29-77, applied at 50% fall leaf shed, caused a delay in shoot elongation, small cupped leaves and an open canopy. Banding at 2 diam on 11-29-77, in addition to decreasing spring shoot growth, resulted in a 50% reduction of leaf size with deep cupping of the leaf blade. No shoot growth reduction was found from the 2-14-78 dormant banding at 4-13-78. However, subsequent growth, while not reduced in elongation, did show some trees with leaf distortion. By 6-18-78, all trees from varying treatment dates which had shown leaf modification and shoot length reduction were making normal growth.

**Table 3. Influence on spring growth of *Ulmus parvifolia* following fall chlorflurenol bark banding with varying dates and band width.**

Date treated	Treatment	Reduction of shoot growth on 4-13-78 <sup>d</sup> %
10-25-77 <sup>a</sup>	1%, 1 diam band	34 <sup>e</sup>
	1%, 2 diam band	49 <sup>f</sup>
11-29-77 <sup>b</sup>	1%, 1 diam band	45 <sup>g</sup>
	1%, 2 diam band	55 <sup>h</sup>
2-14-78 <sup>c</sup>	1%, 1 diam band	0
	1%, 2 diam band	9 <sup>i</sup>

<sup>a</sup>Trees actively growing with little leaf drop

<sup>b</sup>At 50% fall leaf drop. No new growth

<sup>c</sup>Trees dormant and after pruning

<sup>d</sup>Trees pruned and regrowth measured beyond terminal cuts

<sup>e</sup>Normal leaf shape and acceptable canopy density

<sup>f</sup>Leaf size smaller and marginal for acceptable canopy density

<sup>g</sup>Leaf size reduced, leaves cupped and open canopy

<sup>h</sup>Leaf size reduced 50%, leaves cupped and open canopy

<sup>i</sup>Subsequent observations showed 25% of trees with slight leaf distortion but no shoot length reduction

Some degree of leaf curl usually occurs from the Maintain CF 125 treatment but this is minimized by both concentration adjustment (band width) and by application timing. Curl is most prevalent on vigorous young growth. When top pruning for line clearance has occurred there is a stimulation of resprouting on major cuts and it is on this growth that Maintain CF 125 banding will cause the greatest leaf modification. Because of the height and masking by the lower canopy, it has

been found that leaf curl, without outstanding chlorosis, can generally be tolerated.

Trees which were 5 yr old when first treated have received yearly banding for 3 or more yr. This has demonstrated a yearly recovery from the growth inhibition and the need for retreatment as well as a lack of tree decline even on younger more sensitive trees. *Fraxinus uhdei* showed increased development of corky bark in the treated zone as well as an irregular increase in caliper under these repeated bandings on young trees (Figure 1). *Fraxinus uhdei* which were 15 yr old when receiving the first of 3 banding applications have shown no change in bark or trunk growth (Figure 2).



Figure 1. *Fraxinus uhdei* first trunk bark banded when 5 yr old and repeated for 3 consecutive years. An increased development of mature bark characteristics as well as irregular cortex growth is shown.

Some of the young *Fraxinus uhdei* were lifted. Root growth was similar on banded and control trees when related to the trunk diam. Cross section cuts were made through the trunk in and adjoining the areas that were banded. In all cases the interior wood was normal in appearance. The dif-

ferential growth rates that resulted in some uneven surface area was external to the cambium. This is in accord with earlier studies of the effects of chlorflurenol on plants (2).

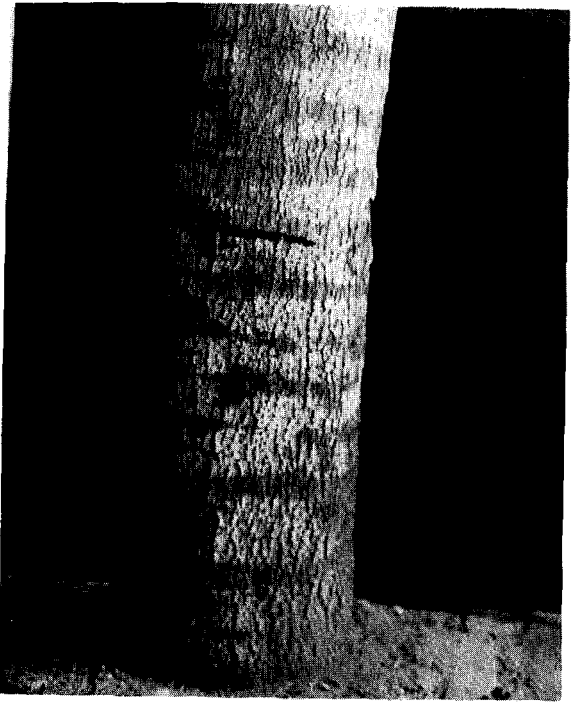


Figure 2. Trunk of 15 yr old *Fraxinus uhdei* where 3 consecutive years of chlorflurenol banding were without influence on bark or cortex.

#### Acknowledgements

Many people helped in various ways to make the study possible. EPRI project RP-380, Roy Sachs project leader, in part supported this work.

#### Literature Cited

1. Hield, H. 1978. *Bark banding with morphactin to inhibit tree growth*. J. Arbor. 4(3): 58-61.
2. Smolinski, Marian. 1976. *Influence of morphactin IT 3456 on the growth and anatomic structure of Vicia faba L. (Faba vulgaris Mnch.), variety 'Hangdown'*. Acta Agrobotanica 29(1): 5-14.

Department of Botany and Plant Sciences  
University of California  
Riverside, California