Increasing Trunk Caliper by Heading Back Laterals

California researchers have demonstrated that trunk diameter and strength of canned tree stock can be significantly increased in 5 months by leaving lateral branches on the trunk, lightly pruning them, eliminating stakes, and spacing the trees so the tops were free to move. Rigidly staked trees with lower limbs removed were taller, of less trunk caliper, and unable to stand upright when planted out without a stake.

A similar experiment was conducted on field-planted *Lagerstroemia speciosa* at the Waimanalo Farm during 1973. Seedling trees were staked to develop an upright leader. Five had all lower limbs pruned several times during the summer. Another group of 5 trees had the lower branches stubbed back to 4–8 inches. All trees were grown with stakes because strong leaders were still developing. Trunk diameters were measured at 2, 4½, and 6 feet from the ground at 3-month intervals.

As Table 1 shows, after 6 months there was a great increase (½ inch) in trunk caliper in the middle portion of trees with stubbed laterals than those with laterals removed. About the same amount of diameter increase (¼ inch) was measured 2 feet from ground level over the 6 month period for both treatments. The leaves on the stubbed laterals were contributing directly to trunk growth in the vicinity of those laterals while there was insufficient food transported from the crown of the plant to the lower trunk on trees pruned cleanly.

Our study and those of California researchers would suggest that the landscape and nursery practice of removing all laterals contributes to a smaller caliper tree and one which is less capable of standing erect without support. Since nursery space is limiting a compromise between this operation and that of no staking or pruning would be to head back laterals on unstaked trees or to stake the trees for a limited time while a leader is developed but remove the stake and head back the laterals once the trunk axis is determined.

Richard A. Criley
Associate Horticulturist

### COMING EVENTS

**Bedding Plant Conference**

Bedding Plants, Inc., will stage its 1975 conference at Newport Beach, California, October 6–8, 1975, at the Newporter Inn. The national organization was formed in 1969 and has a membership of 1,221. The Southern California meeting marks the first time the conference is to be held in the West with BPI, Inc., Past-President Jim Perry, Perry's Plants, Inc. of La Puente, as chairman.
In addition to an extensive educational program, the three-day meeting will include tours to many Southern California bedding plant and flower growing operations.

**Tropical Foliage Short Course**

The 1976 National Tropical Foliage Short Course has been scheduled for the Sheraton-Towers Hotel, Orlando, Florida, January 25–28, 1976. The short course will provide lectures and discussions, educational exhibits, a banquet and hospitality functions. By adding a section and dividing portions of the program into split sessions, the number of speaker hours will be approximately twice that of previous short courses. Subjects to be covered will be of concern to all segments of the foliage industry including: plant producers, brokers, retailers, designers, interiorscape contractors, maintenance experts, and others.

**PANAX PROPAGATION**

Panax, *Polyscias spp.*, is an attractive ornamental shrub grown in Hawaii primarily as a hedge plant. With the increased demand in recent years for tropical foliage plants for indoor container plantings interest has developed in the plant for possible export to the mainland United States.

A study was initiated to gain some information concerning the rooting of four panax cultivars: *P. guilfoylei* 'Crispa,' *P. guilfoylei* 'Variegata,' *P. balfouriana* 'Marginata,' and *P. fruticosa* 'Elegans.' A comparison was made between 2 locally available materials, black cinder and volcanite, and 2 standard materials, vermiculite and perlite as a rooting medium for panax.

Four to six-inch terminal and hardwood cane pieces were stuck in metal flats containing the sterilized rooting media and placed under intermittent mist. The cinder and volcanite were sifted through 1/16 inch mesh screen to remove smaller particles. Rooting percentage and rooting index values were determined after 10 weeks.

The type of cutting had a strong effect on the rooting of all panax cultivars (Table 1). This was especially evident in the rooting index values, which gives an indication of the amount of roots produced per cutting, with the terminal cuttings giving much better rooting than the older wood.

The different cultivars responded similarly except for *P. guilfoylei* 'Variegata' which appeared slightly more difficult to root than the others.

<table>
<thead>
<tr>
<th>Table 1. The effect of type of cutting on rooting of panax cultivars after 10 weeks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivar</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td><em>P. guilfoylei</em> 'Variegata'</td>
</tr>
<tr>
<td><em>P. guilfoylei</em> 'Crispa'</td>
</tr>
<tr>
<td><em>P. balfouriana</em> 'Marginata'</td>
</tr>
<tr>
<td><em>P. fruticosa</em> 'Elegans'</td>
</tr>
<tr>
<td>Mean</td>
</tr>
</tbody>
</table>

The overall performance of the cultivars tested was best when perlite was used as the rooting medium (Table 2). Comparing the individual cultivars shows that all except *P. guilfoylei* 'Crispa' rooted best in perlite. Crispa seemed to root best in the cinder products, volcanite or black cinder. Generally black cinders and vermiculite gave the poorest results.

Based on these results it appears that terminal cuttings of panax in perlite will give the best results. However, there appears to be some difference in response due to media with the various panax cultivars. This aspect will require further testing.

Steven Fukuda  
County Extension Agent  
Fred D. Rauch  
Associate Specialist

**TRACE ELEMENTS**

**FOR CONTAINER NURSERYSTOCK**

Extension workers in Georgia have encountered several situations recently in which nurserymen have applied excessively high rates of trace elements (minor elements) to the potting mixes for container grown shrubs. This has caused disastrous results.
Trace elements vary widely in their concentrations. For example: trade product "A" contains \(0.015\%\) boron, while trade product "B" contains \(3\%\) boron. The \(3\%\) boron would be 200 times as concentrated as is that in the other mix!

Heavy trace element applications can kill or severely stunt the growth of woody ornamentals. Both root injury and foliar injury symptoms can result. Above ground symptoms include leaf drop, chlorosis, marginal leaf burn, and twig dieback. In some cases, the only symptom will be stunted growth.

Some problems have also been noted to occur when the trace element mix was unevenly combined with the potting mix. Diluting with another material such as sand before adding will be helpful in getting a better distribution.

Failure to add trace elements to non-soil potting mixes can, of course, cause growth problems if the fertilizer used does not contain trace elements. This is likely to occur mainly when a liquid feed program is used, or when Osmocote is used as the only fertilizer source.

To sum it up:
1. Failure to add trace elements can result in growth reduction.
2. Don’t apply more than the label recommendation.
3. When adding to a potting mix, do a good job of distributing trace elements evenly in the mix.

Georgia Nursery Notes
May-June, 1975

NURSERY NOTES

Aphelandra Flowering

Production of uniform flowering plants of Aphelandra squarrosa is difficult because it often flowers sporadically over a long time span. Experiments conducted in California have shown that high light intensities (750 to 850 foot-candles) produced plants with 80 percent in full bloom over a five day period.

In order to obtain uniform flowering, it is necessary to have cuttings that are uniformly vegetative or uniformly reproductive. Vegetative cuttings can be obtained by maintaining the stock plants under low light intensity (300 to 400 foot-candles), and cuttings with uniform flower bud development can be obtained by pruning the stock plants and growing them under high light intensity (750 to 850 foot-candles). Pruning ensures the production of shoots of the same age that bud uniformly under high light intensity. Regardless of whether low or high light is used for growing stock plants, high light intensity should be used during rooting and subsequent growth of rooted cuttings to obtain the fastest and most uniform flowering.

Florida Foliage Grower
June, 1975

Blooming and Booming

Cut carnations, gladioli, roses, and chrysanthemums—as well as potted chrysanthemums—from 22 major growing States brought a total of $234 million in wholesale sales last year. Growers realized an additional $111 million in foliage plant sales—up nearly two-thirds from a year earlier. California remained the top producer of carnations, standard and potted mums, and roses, while Florida turned out the most gladioli and foliage plants. Most of the roughly 3,300 commercial producers surveyed by SRS had sales of $10,000 to $100,000. Nonetheless, 20% reported sales ranging from $100,000 to $250,000, and 15% claimed more than $250,000.

Agricultural Situation
July, 1975

Lighting Cuttings

Work at Michigan State shows that supplemental light over the propagating bench improves rooting of mums, geraniums and poinsettias, especially when the days are short. Further work is needed to determine the kind and amount of light that is most effective. Too much seems harmful.

Jamaica’s Newest Export Item

Anthuriums are being shipped from Jamaica at the rate of 12,000 each week, which represents 25 percent of Jamaica’s production. The rest is marketed locally. Plans are to increase production to 4,000 dozen per week on 20 acres within 5 years after the project was started. The initial planting consisted of 80,000 hybrid plants brought in from Hawaii. These beautiful blooms last from 2 to 3 weeks so many travellers carry them back to the U.S., Canada, and Europe as a reminder of their Jamaican holiday.

Newsletter
Tropical Region ASHA
No. 88, April, 1974
A THIRD VIROID DISCOVERED

Cornell University researchers have found that a new kind of disease-producing organism called a "viroid" is the cause of the chlorotic mottle disease of chrysanthemums—a plant disease previously believed to be of viral origin.

Prof. R. Kenneth Horst, plant pathologist, and C. Peter Romaine, graduate student, both at the N.Y. State College of Agriculture and Life Sciences, Cornell, reported their finding in a recent issue of "Virology."

This viroid is a third infectious agent of its kind known to exist. The first viroid, reported in 1971, was found to be the cause of the spindle tuber disease of potatoes. Scientists believe that this viroid also causes another plant disease called citrus exocortis.

More recently, a second viroid was discovered, which was determined to be the cause of the stunt disease of chrysanthemums.

Horst explained that the viroid is distinct from viruses, bacteria, and fungi in physical makeup and other characteristics, and is about 30 times smaller than many common types of viruses.

He described the viroid as a fragment of ribonucleic acid (RNA), a genetic component in the cell. Unlike viruses, it has no protective protein coat around its nucleic acid core.

Horst said that viroids are probably widespread in nature along with other types of microorganisms. Some diseases affecting plants and animals, including humans, now believed to be of viral origin may be caused by viroids.

The Cornell researchers reported that only chrysanthemums, including some wild species, are susceptible to this viroid. How the viroid is transmitted from one plant to another is still a mystery.

In another phase of his work, Horst discovered a latent strain of the viroid. This is the first time a latent viroid strain has been found to exist.

Horst said the latent strain causes no visible disease symptoms. Even when the severe strain (symptom-inducing viroid) is introduced into the plant that carries the latent strain, no symptoms appear.

"In other words, the latent strain apparently holds the severe strain in check, protecting the plant from disease development," Horst explained. "The mechanism of this protection is not known at this stage, but under certain environmental conditions the severe strain may become predominant."

The chlorotic mottle disease was first described several years ago as a viral infection, although scientists were unable to pinpoint the disease-causing agent. When infected, the plant leaves become severely mottled and turn yellow. In serious cases, the plant does not bloom and dies.

So far, there is no known cure for this disease. However, commercial chrysanthemum propagators can keep the disease in check by eliminating diseased plants detected with special laboratory screening techniques developed earlier by Horst and other Cornell scientists.

New York State Flower Industries Bulletin No. 58, May, 1975

DWARF BRASSAIA STOCK BLOCK

Little information is available on yield of cuttings from stock block plantings of foliage plants under Hawaii conditions. A planting of Dwarf Brassaia (Brassaia arboricola) was established at the Waimanalo Experiment Station during the summer of 1974 to evaluate various preemergent herbicides for weed control in stock block establishment. A total of 255 established, 6-inch container plants were set out at a spacing of 2 feet by 5 feet. The first cuttings were taken after 4 months by heading all plants back to 12 inches above the ground. The plots were then harvested every 2 months by removing all available 6-inch terminal cuttings.

Table 1. Yield of 6-inch, terminal cuttings of Dwarf Brassaia (Brassaia arboricola) during the first year

<table>
<thead>
<tr>
<th>Harvest – Months after planting</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuttings/plant</td>
<td>0.9</td>
<td>1.5</td>
<td>3.8</td>
<td>7.2</td>
<td>13.4</td>
</tr>
<tr>
<td>Cumulative total</td>
<td>0.9</td>
<td>2.4</td>
<td>6.2</td>
<td>13.4</td>
<td>26.8</td>
</tr>
</tbody>
</table>

The average yield per plant for each harvest is shown in Table 1. The average yield for the 255 plants for the first year in the field was 26.8 cuttings per plant. At the plant spacing used in this trial (2 feet by 5 feet), the plants had grown together in the row but still had ample room between rows for harvest operations. Continuing this harvest method of taking out terminal cuttings, it should be possible to maintain the plants for another 6 to 12 months. After that some plant removal or severe pruning may be required.

Making a few assumptions, the projected yield and returns have been calculated for various
Table 2. The projected yield and returns of one acre of Dwarf Brassia at various plant spacings as shown in Table 2. Using the spacing in this trial (2 x 5 feet), 4,356 plants would be required to plant one acre of stock plants at a cost of $3,267 assuming 75 cents/plant. This would result in 116,741 cuttings harvested the first year with a return of $5,837 assuming a selling price of 5 cents per unrooted cutting. These figures do not include any of the other start up costs such as labor and land preparation but it appears feasible to break even some time after the first year.

Fred D. Rauch  
Associate Specialist in Horticulture

### Table 2. The projected yield and returns of one acre of Dwarf Brassia at various spacing

<table>
<thead>
<tr>
<th>Spacing (feet)</th>
<th>1 Acre Plants</th>
<th>1st year Cost</th>
<th>1st year Cuttings</th>
<th>1st year Return</th>
<th>2nd year Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 5</td>
<td>4356</td>
<td>$3,267</td>
<td>116,741</td>
<td>$5837</td>
<td>522,720</td>
</tr>
<tr>
<td>3 x 5</td>
<td>2904</td>
<td>2,178</td>
<td>77,827</td>
<td>3891</td>
<td>348,480</td>
</tr>
<tr>
<td>4 x 5</td>
<td>2178</td>
<td>1,633</td>
<td>58,370</td>
<td>2919</td>
<td>261,360</td>
</tr>
<tr>
<td>5 x 5</td>
<td>1742</td>
<td>1,306</td>
<td>46,686</td>
<td>2334</td>
<td>209,040</td>
</tr>
<tr>
<td>2 x 6</td>
<td>3630</td>
<td>2,722</td>
<td>97,284</td>
<td>4864</td>
<td>436,600</td>
</tr>
<tr>
<td>3 x 6</td>
<td>2420</td>
<td>1,815</td>
<td>64,856</td>
<td>3243</td>
<td>290,400</td>
</tr>
<tr>
<td>4 x 6</td>
<td>1815</td>
<td>1,361</td>
<td>48,642</td>
<td>2432</td>
<td>217,800</td>
</tr>
<tr>
<td>5 x 6</td>
<td>1452</td>
<td>1,089</td>
<td>38,914</td>
<td>1946</td>
<td>174,240</td>
</tr>
</tbody>
</table>

1 Assuming $0.75 for 6-inch plant.  
2 Assuming $0.05 per unrooted cutting.  
3 Assuming 20 cuttings/plant/harvest.

NOTE:  
The use of trade names is for the convenience of readers only and does not constitute an endorsement of these products by the University of Hawaii, the College of Tropical Agriculture, the Hawaii Cooperative Extension Service, or their employees.

*The color of paper this month is white. This is due to the shortage of color paper, and in future paper color will be subject to available stocks.*