The Use of Treeshelters to Improve Transplant Success of Trees in the California Landscape

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Experimental Methods

Ten different tree species were planted in April, 1993. Half of these trees were placed in 122-cm tall treeshelters. At 2-month intervals, tree height and stem caliber were measured. The height increase and stem caliber response for all ten species are shown on the following page (Figure 1). In April, 1994, half the trees were removed from the soil for top and root fresh and dry weights.

Results

During the first growing season, all sheltered trees grew taller (Photo 1). However, once trees grew out of the shelter their growth rate decreased and by the middle of the second growing season the unsheltered trees were essentially the same height as the sheltered trees for several of the species. The following trees were taller when grown in a treeshelter: *Quercus lobata, Quercus agrifolia, Lagerstroemia indica, Maytenus boaria* and *Pinus canariensis*. The following had reduced stem caliber when grown in a treeshelter: *Sequoia sempervirens,*

Photo 1. *Growth response of a Platanus racemosa tree with (center, right) and without (center, left) treeshelters. The growth response for a Fraxinus latifolia tree and other species can be seen in the background.*

Figure 1. Stem height and caliber response over time of trees growing with or without treeshelters. The horizontal line in each graph represents the height of the treeshelter (122 cm).

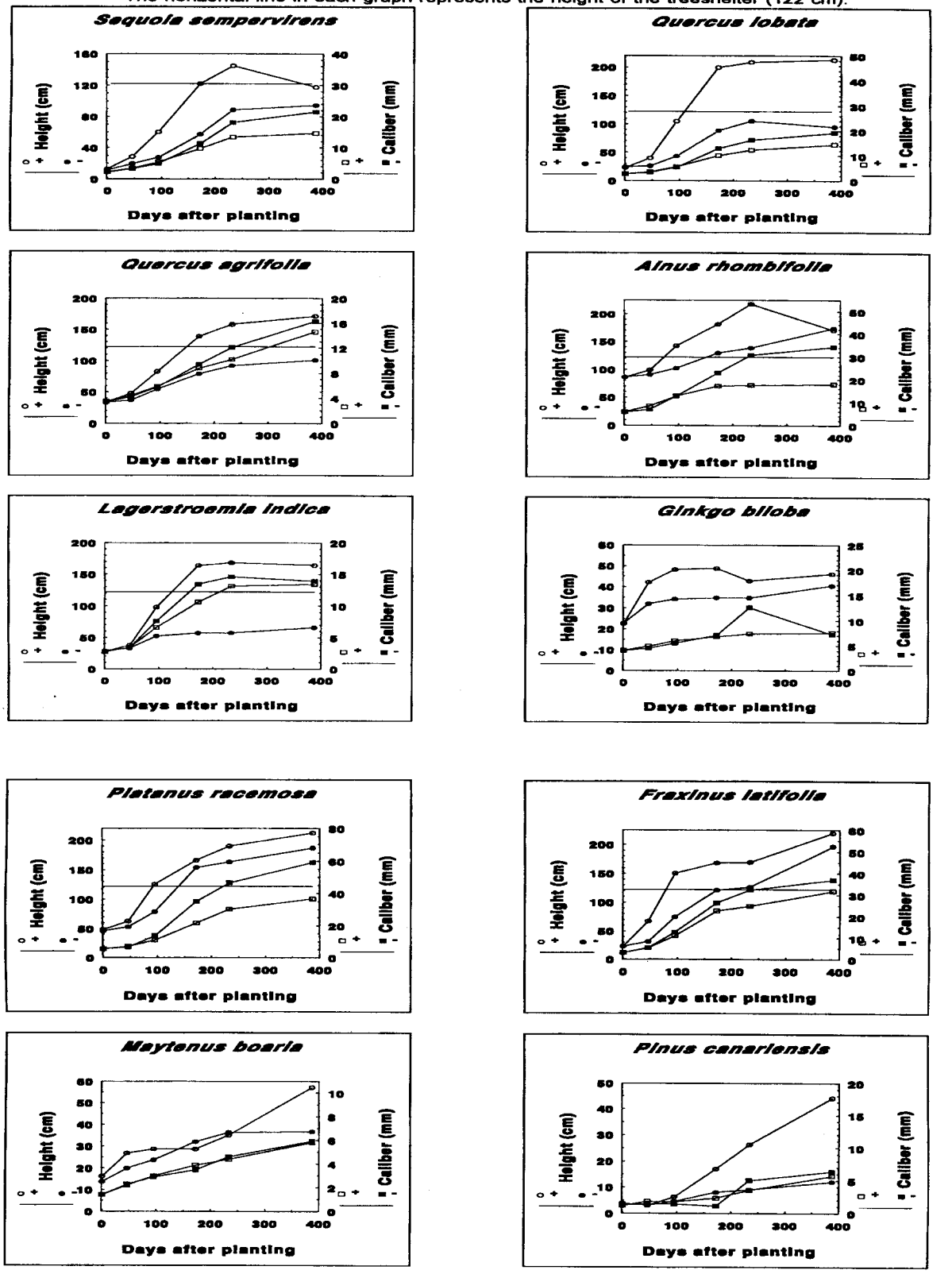

Table 1. Harvest results from trees growing with (+) and without (-) treeshelters at UC Davis. Means followed by different letters are significantly different at p=0.05 using Duncan's New Multiple Range Test.

Species	+/- Shelter	Height (cm)	Caliber (mm)	Top Fresh Weight (g)	Root Fresh Weight (g)	Top Dry Weight (g)	Root Dry Weight (g)
Sequoia sempervirens	-	97 a	26.4 a	1213 a	231 a	386 a	64 a
	+	81 a	13.7 b	316 b	57 b	102 b	15 b
Quercus lobata	-	95 b	19.0	210	227	162	91
	+	223 a	15.3	350	155	96	66
Quercus agrifolia	-	90 b	15.7	221	100	113	43
	+	171 a	14.5	289	97	143	40
Alnus rhombifolia	-	173	36.0 a	2431 a	746 a	847 a	249 a
	+	112	21.0 b	426 b	181 b	158 b	58 b
Lagerstroemia indica	-	59 b	14.8	345	91	120 b	39 a
	+	165 a	12.8	423	72	177 a	28 b
Ginkgo biloba	-	36	7.5	40	29	11	6
	+	41	7.2	28	22	7	4
Platanus racemosa	-	180	62.2 a	4735 a	2149 a	1518 a	673 a
	+	216	41.3 b	2243 b	951 b	720 b	287 b
Fraxinus latifolia	-	185	35.1	1658	779 a	542	259 a
	+	221	30.1	1345	426 b	463	147 b
Maytenus boaria	-	32 b	5.5	25	14	10	3
	+	53 a	6.2	41	14	15	4
Pinus canariensis	-	12 b	6.4	10	3	3	1
	+	40 a	5.6	18	3	6	1

Alnus rhombifolia and *Platanus racemosa*. The reduced caliber of these trees often led to trunk bending problems at the top of the treeshelter (Photo 2). The following trees had reduced top and root fresh and dry weight when grown in a treeshelter: *Sequoia sempervirens, Alnus rhombifolia, Platanus racemosa* and *Fraxinus latifolia.* A reduction in root system mass and volume is a consistent observation in trees grown in treeshelters (Photo 3).

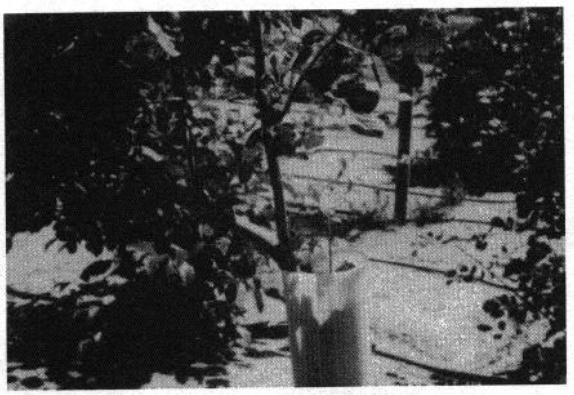

Photo 2. *An example of severe trunk bending at the top of the treeshelter as a result of poor caliber development in a sheltered tree.*

Photo 3. *A comparison of root systems from an unsheltered tree (left) and a sheltered tree (right).*

Conclusions

Quercus lobata, Quercus agrifolia, Maytenus boaria and *Pinus canariensis* trees responded favorably to treeshelters. They are slow to very slow-growing trees and grew faster with no reduction in stem caliber when grown in treeshelters. Treeshelters can provide protection from animals. *Pinus canariensis* seedlings that were grown without a treeshelter did not survive due to crow damage; those grown in treeshelters were protected.

Seguoia sempervirens, Alnus rhombifolia, Platanus racemosa and *Fraxinus latifolia* trees did not respond favorably to treeshelters. These are all relatively fast-growing tree species and showed reductions in stem caliber development and root growth.

Ginkgo biloba did not grow well in the experiment regardless of how it was grown and *Lagerstroemia indica* grew primarily as a multi-stemmed shrub so that stem caliber development was difficult to assess.

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