Summary of California research on the effects of incorporating Broadleaf P4 into a container medium for plant production.

Introduction

The research was designed to establish whether the incorporation of Broadleaf P4 into growing media would:

a) Reduce the watering frequencies.
b) Increase speed of plant development and maturity/market-readiness.
c) Save potting media and/or fertilisers
d) Reduce labour costs
e) Reduce overall production costs

Experiment Design

Three different mixes of container growing media were used as a base for the trial, which commenced with potting-on in October of young plants from 10-cm to 4-litre containers:

(1) **Standard Medium,** - nursery's own inexpensive mix:
70% sawdust (fir/cedar mix)
20% sand
10% decomposed granite.
(This mix was used as both control and with Broadleaf P4 as the 'Amended Medium.')

(2) **Premium Medium** - used within the nursery for specific crops not responding well to standard medium. This mix classed as expensive.
40% peat moss
30% forest moss
20% pumice
10% vermiculite
(Forest moss is ground Redwood bark, having similar characteristics to peat except for its expansion factor).

(3) Amended Medium
Third medium used was Standard Medium plus Broadleaf P4 at a rate of 1 Kg per M^3 - referred to as Amended Medium.
All media were given the addition of:

Dolomitic Lime	1.8 Kgs/M^3
Calcium Carbonate Lime	1.8 Kgs/M^3
Ferrous Sulphate 31%	0.6 Kgs/M^3

plus variations in rates of Osmocote 17-7-12 slow release fertiliser. See Table 1 for fertiliser treatments.

Table 1. Fertiliser application rates to respective media.

	Fertiliser Rates (Kgs/M³)		
	3.5	5.3	7
Standard Medium	-	-	S-7
Std Medium + 1Kg P4/M³	S-3.5	S-5.3	S-7
Premium Medium	P-3.5	P-5.3	P-7

A total of six different plant species were used, and each species was replicated 10 times for each treatment.

Species were: *Diosma pluchrum, Euryops viridis, Ligustrum texanum, Marguerite white daisy, Photinia fraseri, Verbena pink*.

All plant species were 10 cm liners and all potted-on into respective media in 4-litre pots during mid October. Watering was identical on all treatments during the 1st two weeks of establishment but from November was only given as the plant required and amounts given were recorded over the 420 pots involved. (First sign of leaf wilt was used to determine plant demand).

Table 2
Summary of plant diameter and *height* (shown in italics) data, collected on March 8. All values are averages of 7 measurements. All values are given in centimetres.

	←	Standard Container Medium →			←	Premium Medium →		
		←	Amended Medium →				
	7 kgs. Fert	3.5 Kgs Fert.	5.3 kgs Fert.	7 kgs Fert.	3.5 Kgs Fert.	5.3 kgs Fert.	7 kgs Fert.
Diosma	14.57	19.10	20.29	20.71	19.71	19.86	20.57
	11.29	*15.70*	*19.00*	*18.14*	*13.14*	*13.14*	*14.29*
Euryops	29.86	29.29	32.14	28.86	30.00	30.71	29.29
	36.14	*31.71*	*34.43*	*29.14*	*25.86*	*24.89*	*24.71*
Ligustrum	17.43	26.29	23.86	24.14	19.71	20.29	20.14
	17.71	*18.24*	*21.43*	*21.71*	*16.57*	*16.86*	*16.86*
Marguerite	28.43	27.29	29.00	31.43	31.57	34.29	35.00
	27.29	*26.86*	*30.14*	*29.14*	*25.43*	*31.00*	*29.14*
Photinia	19.33	22.86	22.43	31.71	27.14	26.71	30.43
	20.33	*24.71*	*28.57*	*33.86*	*26.57*	*32.43*	*35.29*
Verbena*	46.00	50.29	51.00	45.57	49.14	44.86	45.86

*Verbenas grow close to the ground, so height measurements not taken.

Results

By early December it was readily apparent that there were differences in growth response in respect to the different treatments.

By mid-January all the Marguerite plants growing in P4-amended compost were in full bloom, whereas virtually none in Standard Medium without P4 had any blooms showing and less than one-third of the Marguerites in the Premium mix were in bloom. It should be noted that when flowering plants are in bloom, vegetative growth slows down or stops. This means that the Marguerite measurements of height and diameter, taken in March, show less advantage from the P4 treatment over the untreated plants than was actually the case, because **the P4-treated Marguerites were market-ready 4 to 6 weeks ahead of the controls** – a very substantial benefit.

Had 'time to market-readiness' been used as the measurement of assessment, the results would have shown a significantly greater advantage for the P4 treatment on all plant species compared with the unamended Standard Medium and for all fertiliser treatment rates in the Premium Medium.

All individual measurements were analysed by an Analysis of Variance computer programme compensated with standard error factor.

Conclusions

(1) A 30% saving in irrigation water for plants grown in P4 Amended Medium compared with the water requirements of non-P4 media.

(2) P4-Amended Medium produced better quality plants at 3.5 Kgs/M3 fertiliser rate than Standard medium at 7 kgs/M^3, thus reducing fertiliser requirements by 50%.

(3) P4-Amended Medium at 5.3 Kgs/M^3 fertiliser rate out-performed Premium Medium at 7 kgs/M^3, thus reducing fertilizer requirements by 25%.

(4) Earlier maturity was recorded on all flowering plants, thus giving earlier market-readiness and higher selling prices for the grower.

(5) A bulking effect of approx 10% was noted when adding (prehydrated) Broadleaf P4 to the medium.

Summary

The results of these trials show that using Broadleaf P4 in an inexpensive medium and at 50% less slow-release fertiliser can produce plant results the same or slightly better than the same media at twice the fertiliser rate and than a more costly medium at one-third higher slow-release fertiliser rate. The combination of a 10% bulking factor in compost volume, with a fertiliser cost reduction of 50%, added to the savings in both water volumes and labour reduction costs more than offsets the cost of Broadleaf P4. Additional benefits can be expected during a growing season by producing better quality plants that are market-ready earlier, thus attracting premium prices and enabling a greater volume of plant throughput in a given production area in the course of a year.