Performance of the '1980 Series' *Populus deltoides* × *P. nigra* Hybrids on Three Sites.

Fung, L. E.[1], Hurst, S. E.[1] and Wills, B. G.[2]

[1] HortResearch
Palmerston North Research Centre
Private Bag 11-030
Palmerston North

[2] AgResearch
PO Box
Alexandra

INTRODUCTION

As a result of the arrival of poplar leaf rusts and anthracnose from 1973 onwards; poplar breeding in New Zealand has concentrated on producing disease-resistant clones through interspecific hybridisation.

In 1980 as series of crosses was made using *Populus nigra* 'Italica' (Lombardy poplar) as the male parent and a number of disease-resistant *P. deltoides* (Eastern cottonwood) as the female parents. Clones of these hybrid crosses, *P. deltoides* × *P. nigra*, are also referred to as *P.* ×*euramericana* clones. Following the subsequent nursery selection, 36 clones were selected for further field trials. These trials were established over a three year period (1986-1988) and covered a large range of sites from Northland to Otago.

Only one clone (*P.* ×*euramericana* 'Argyle', NZ5015) has been commercialised from this series of crosses, although another 12 promising clones have been named and a number are due for release in the near future. An indication of the performance of these clones will assist in correct siting.

This report covers growth assessments from three sites. Although file records exist for most of the sites, field identification of the clones is now very difficult and often impractical, due to tree mortality and loss of colour markings over the years. The three sites were chosen for ease of accessibility and ability to correctly identify clones.

Results are presented and some limitations in the data are mentioned. A more complete analysis and discussion will be presented in a later paper for publication and will be made available to the WPRC members.

SITES

All sites were established using three metre poles from the Aokautere Nursery, colour coded by clone. Other site details and assessments are given in Tables 1a and 1b:

Table 1a. Site details

Site	Altitude (m)	Aspect	Slope (°)	Mean Ann rainfall (mm)	Date of Establishment
Henley, Coastal Otago	90	N	10-20	720	July 1986
Weraiti, Wairarapa	150	N – NW	26-35		June 1987
Pohangina, Manawatu	200	NE + SW	25-30	900	June 1987

Table 1b. Site assessments

Site	Number of blocks	Measurements	Date of Assessment
Henley, Coastal Otago	5	DBH, Tree height (Ht), Volume Index (VI)	Sept. 1999
Weraiti, Wairarapa	5	DBH, Tree height (Ht), Volume Index (VI)	Sept. 1999
Pohangina, Manawatu	3	DBH	Jan. 2000

Volume index (VI) was derived from DBH and tree height (DBH × Ht). The trials were planted as randomised complete block designs. Results were analysed by each site using SAS. As there were missing values or over/under representation of clones in blocks, the Generalised Linear Models procedure was used to account for the resulting unbalanced design.

RESULTS

Significance levels (Pr > F) for each site are given in Table 2. An effect is deemed significant at the 95% probability level ($p = 0.05$)

Table 2. Significance levels for measurements at each site

Site	Effect	DBH	Ht	VI
Henley	Clone	0.0001	0.0001	0.0001
	Block	0.0001	0.0001	0.0001
	Clone × Block	0.0001	0.0001	0.0001
Weraiti	Clone	0.0039	0.0344	0.0163
	Block	0.8150	0.5868	0.7696
	Clone × Block	0.2056	0.0847	0.2280
Pohangina	Clone	0.0353	-	-
	Block	0.0108	-	-
	Clone × Block	0.1286	-	-

Henley

Highly significant ($p = 0.0001$) clonal differences were observed for DBH, Ht and VI. There were also highly significant block effects for all variables as well as clone × block interactions (Table 2).

Overall clonal differences are shown in Table 3 and Figure 1. Although rankings changed between the measurements (DBH, Ht, VI) it is apparent that a number of clones generally performed well in all measurements (e.g. clones '15/39', '2/23', 'Weraiti', 'Argyle'), while another group generally performed poorly ('Eridano', '2/36', Eastwood', '29/104', '15/58').

Table 3. Mean DBH, Height (Ht) and Volume Index (VI) of clones (13 years) at Henley, Otago. Values with the same letter are not significantly different.

Clone	DBH	n	Clone	Ht	n	Clone	VI	n
15/39	25.00 [a]	6	Henley	14.90 [a]	9	15/39	385.20 [a]	6
Weraiti	23.80 [ab]	5	15/39	14.72 [ab]	6	2/23	345.04 [ab]	9
2/23	23.33 [abc]	9	2/23	14.68 [ab]	9	Weraiti	342.56 [ab]	5
Flevo	23.00 [abcd]	7	Weraiti	14.40 [abc]	5	Argyle	325.72 [abc]	9
Argyle	22.67 [abcde]	9	29/5	14.34 [abcd]	8	Henley	315.71 [abcd]	9
2/33	22.10 [abcdef]	10	2/33	13.79 [abcde]	10	2/33	311.48 [abcd]	10
33/87	21.38 [bcdefg]	8	33/36	13.72 [abcdef]	9	29/5	311.44 [abcd]	8
Dudley	21.13 [bcdefg]	8	Fraser	13.58 [abcdefg]	5	33/36	287.33 [bcde]	9
33/36	20.89 [bcdefgh]	9	Selwyn	13.37 [abcdefg]	9	Tasman	284.40 [bcde]	7
Tasman	20.86 [bcdefgh]	7	Tasman	13.19 [abcdefg]	7	33/87	284.25 [bcde]	8
29/5	20.75 [bcdefgh]	8	15/20	13.08 [abcdefgh]	8	Flevo	280.51 [bcde]	7
Otahuao	20.70 [bcdefgh]	10	33/87	12.99 [abcdefghi]	8	Dudley	270.83 [bcde]	8
Henley	20.67 [bcdefgh]	9	Argyle	12.93 [abcdefghij]	9	Cromarty	268.53 [bcde]	7
Kilmog	20.38 [bcdefghi]	8	Pakaraka	12.86 [bcdefghij]	9	29/4	267.52 [bcde]	9
29/4	20.33 [bcdefghi]	9	Cromarty	12.77 [bcdefghij]	7	Selwyn	266.11 [bcde]	9
Margarita	19.90 [cdefghi]	10	Dudley	12.48 [cdefghij]	8	Pakaraka	254.76 [cdef]	9
Cromarty	19.86 [cdefghi]	7	7/86	12.44 [cdefghij]	7	Margarita	252.37 [cdef]	10
7/86	19.71 [defghi]	7	Kainga	12.40 [cdefghij]	7	15/57	249.80 [cdef]	7
Pakaraka	19.56 [defghi]	9	15/57	12.37 [defghij]	7	7/86	249.74 [cdef]	7
Veronese	19.33 [efghi]	9	14/11	12.24 [efghij]	7	Otahuao	246.66 [cdef]	10
15/57	19.29 [efghi]	7	Margarita	12.22 [efghij]	10	Kilmog	245.94 [cdef]	8
14/14	19.13 [efghi]	8	29/4	12.20 [efghij]	9	Kainga	242.44 [cdef]	7
Selwyn	19.11 [efghi]	9	15/58	11.80 [efghij]	2	15/20	239.29 [def]	8
24/4	18.75 [fghij]	8	24/4	11.80 [efghij]	8	24/4	238.13 [def]	8
15/55	18.67 [fghij]	9	Flevo	11.80 [efghij]	7	Fraser	237.68 [def]	5
Kainga	18.57 [fghij]	7	Kilmog	11.80 [efghij]	8	Veronese	235.87 [def]	9
Eastwood	18.14 [ghijk]	7	Veronese	11.73 [fghij]	9	14/14	225.65 [ef]	8
29/104	18.13 [ghijk]	8	14/14	11.73 [fghij]	8	14/11	220.44 [ef]	7
15/58	17.50 [hijk]	2	Otahuao	11.64 [ghij]	10	15/55	213.97 [ef]	9
14/11	17.43 [hijk]	7	Eastwood	11.13 [hij]	7	15/58	210.50 [ef]	2
Fraser	17.00 [ijk]	5	29/104	10.98 [ij]	8	29/104	207.00 [ef]	8
15/20	16.88 [ijk]	8	15/55	10.97 [ij]	9	Eastwood	204.44 [ef]	7
2/36	15.50 [jk]	8	2/36	10.94 [j]	8	2/36	178.54 [fg]	8
Eridano	15.00 [k]	2	Eridano	8.50 [k]	2	Eridano	127.50 [g]	2

It is also important to note that some clones had broken tops from wind damage, which may have affected their overall performance (these clones are represented in Figure 1 with hatched bars).

Table 4. Rate of top breakage by clone

Clone:	'15/39'	'Flevo'	'29/4'	'2/36'	'Veronese'	'Kainga'	'Dudley'	'24/4'
Rate of Breakage	67%	57%	33%	25%	22%	14%	12.5%	12.5%

Thus while clone '15/39' was a consistently high performing clone, it also had the highest rate of stem breakage.

Weraiti

Significant ($p = 0.05$) clonal differences were for DBH, Ht and VI. There were no significant block or clone × block differences.

Mean clonal differences are shown in Table 5 and Figure 2. Clones ‘2/33’, ‘Argyle’ and ‘Weraiti’ had significantly greater DBH than ‘Selwyn’, ‘Eastwood’ and ‘Kawa’. Clones ‘2/33’ and ‘Weraiti’ also had the greatest Ht and VI values and were significantly greater than ‘Eastwood’, ‘15/55’ (for Ht and VI), ‘Eridano’ (for Ht only) and ‘Kawa’ (for VI).

Table 5. Mean DBH, Height (Ht) and Volume Index (VI) of clones (12 years) at Weraiti, Wairarapa. Values with the same letter are not significantly different.

Clone	DBH	n	Clone	Ht	n	Clone	VI	n
2/33	36.80 ^{a}	1	2/33	18.00 ^{a}	1	2/33	662.40 ^{a}	1
Argyle	36.51 ^{a}	9	Weraiti	17.85 ^{ab}	8	Weraiti	650.03 ^{ab}	8
Weraiti	36.43 ^{a}	8	Magarita	17.03 ^{abc}	9	Argyle	607.41 ^{abc}	9
Otahuao	34.26 ^{ab}	9	Fraser	16.98 ^{abc}	10	Magarita	578.98 ^{abcd}	9
Kilmog	33.72 ^{ab}	9	Argyle	16.28 ^{abcd}	9	Otahuao	555.39 ^{abcd}	9
Magarita	33.68 ^{ab}	9	Pakaraka	16.28 ^{abcd}	9	Kilmog	531.26 ^{abcd}	9
Kainga	31.20 ^{ab}	8	Dudley	16.21 ^{abcd}	8	Fraser	515.45 ^{abcd}	10
Pakaraka	30.78 ^{ab}	9	Otahuao	16.10 ^{abcd}	9	Pakaraka	514.16 ^{abcd}	9
Eridano	30.57 ^{ab}	3	Selwyn	15.96 ^{abcd}	7	Kainga	495.45 ^{abcd}	8
Fraser	30.04 ^{ab}	10	Kainga	15.76 ^{abcd}	8	Dudley	467.18 ^{abcd}	8
Dudley	29.79 ^{ab}	9	Kilmog	15.47 ^{abcd}	9	Eridano	463.33 ^{abcd}	3
15/55	29.10 ^{ab}	10	Kawa	15.40 ^{abcd}	5	Selwyn	461.20 ^{abcd}	7
Selwyn	28.14 ^{b}	7	Eridano	15.10 ^{bcd}	3	15/55	443.10 ^{bcd}	10
Eastwood	28.04 ^{b}	8	15/55	14.93 ^{cd}	10	Kawa	402.80 ^{cd}	5
Kawa	27.42 ^{b}	6	Eastwood	13.91 ^{d}	8	Eastwood	396.00 ^{d}	8

Pohangina

Significant clonal differences were observed (Table 6, Figure 3). ‘Eastwood’ had the largest DBH and was significantly different from all other clones. Other clones showed a continuum with ‘Cromarty’ and ‘Argyle’ having the next largest DBH. There was also a significant block effect, where clones growing in the lower slope/valley had generally larger DBH than those on the mid/upper slope.

Table 6. Mean DBH of clones (12 years) at Pohangina, Manawatu. Values with the same letter are not significantly different.

Clone	DBH	n	Clone	DBH	n
Eastwood	40.90 ^{a}	1	29/104	21.40 ^{bcdefghij}	3
Cromarty	30.07 ^{b}	3	Fraser	21.25 ^{bcdefghij}	4
Argyle	29.17 ^{b}	3	33/87	19.57 ^{cdefghijk}	3
Pakaraka	29.07 ^{bc}	3	Tasman	19.10 ^{defghijk}	2
Otahuao	27.40 ^{bcd}	3	2/36	19.00 ^{defghijk}	1
Margarita	27.17 ^{bcde}	3	24/4	18.00 ^{efghijk}	3
Weraiti	26.03 ^{bcdef}	3	2/23	17.30 ^{fghijkl}	3
Kilmog	25.90 ^{bcdef}	3	29/4	16.80 ^{fghijkl}	3
7/86	25.13 ^{bcdef}	3	2/33	15.53 ^{ghijkl}	3
Selwyn	24.93 ^{bcdefg}	3	15/20	14.73 ^{hijkl}	3
Kainga	23.90 ^{bcdefgh}	3	14/14	13.27 ^{ijkl}	3
Henley	22.73 ^{bcdefghi}	3	15/55	12.90 ^{jkl}	3
15/57	22.30 ^{bcdefghij}	2	29/5	10.23 ^{kl}	6
Dudley	21.47 ^{bcdefghij}	3	15/39	9.10 ^{l}	3

As with the Henley site, a number of clones exhibited poor form (apical dominance) usually as a result of stem breakage. These clones tended to have smaller DBH values (Table 7).

Table 4. Rate of malformation by clone

Clone:	'29/5'	'15/20'	'15/55'	'Tasman'	'29/4'	'29/104'	'33/87'	'2/33'	'13/39'
Malformation rate:	67%	67%	67%	50%	33%	33%	33%	33%	33%

DISCUSSION

A number of limitations to the data need to be highlighted when interpreting the results:

- Some clones are present in very small numbers ('Eridano' and '15/58' at Henley, 'Eridano' and '2/33' at Weraiti, and 'Eastwood' and '2/36' at Pohangina). This may be due to uneven numbers at planting or loss of trees over the life of the trial. As this could not be determined, the presence of these clones introduces a larger margin of error.

- A statistical comparison between sites has not been attempted. Not all clones are represented in all sites, and site effects are assumed to be large (the underlying rationale for establishing trials over a range of sites).

Nevertheless some interesting trends are emerging:

- 'Argyle' consistently performs highly on all three sites.
- 'Weraiti' performs well on the two East Coast sites (Henley and Weraiti).
- Other named clones also appear to perform moderately well on all sites.
- Some apparently high performing clones on the West Coast site (Pohangina) perform poorly on East Coast sites ('Eastwood', 'Selwyn').
- Some apparently high performing clones on East Coast sites perform poorly on the West coast site (e.g. '2/33', '15/39', '2/23').

It should also be noted that these results look at growth measures only. Other qualitative criteria will also be involved in determining use of clones (e.g. possum resistance, crown spread, bark roughness, leaf fall).

No further measurements are planned for the 1980 series trials; field identification of surviving trees is problematical unless the sites have been well maintained and regularly inspected. Future measurements will target trials of newer material.

Appendix 1

CLONE	Block	DBH	se	n	Ht	se	n	VI	se	n
14/11	1	15.0	1.88		9.60	1.069		148.80	43.911	
14/11	3	17.0	1.88		13.75	1.069		237.05	43.911	
14/11	4	18.0	2.66		12.10	1.512		217.80	62.099	
14/11	5	20.0	1.88		13.45	1.069		276.80	43.911	
14/14	1	21.0	1.88		11.10	1.069		234.10	43.911	
14/14	2	19.5	1.88		11.15	1.069		221.70	43.911	
14/14	3	15.0	2.66		11.10	1.512		166.50	62.099	
14/14	4	20.0	2.66		12.00	1.512		240.00	62.099	
14/14	5	18.5	1.88		13.10	1.069		243.55	43.911	
15/20	1	11.5	1.88		8.85	1.069		102.75	43.911	
15/20	2	12.5	1.88		10.00	1.069		124.75	43.911	
15/20	3	20.5	1.88		15.90	1.069		326.00	43.911	
15/20	4	23.0	1.88		17.55	1.069		403.65	43.911	
15/39	1	13.0	2.66		9.70	1.512		126.10	62.099	
15/39	2	21.0	2.66		12.10	1.512		254.10	62.099	
15/39	3	28.0	1.88		16.00	1.069		448.00	43.911	
15/39	4	30.0	1.88		17.25	1.069		517.50	43.911	
15/55	1	14.0	2.66		6.60	1.512		92.40	62.099	
15/55	2	13.5	1.88		8.95	1.069		120.90	43.911	
15/55	3	20.0	1.88		10.70	1.069		214.70	43.911	
15/55	4	19.5	1.88		11.60	1.069		225.85	43.911	
15/55	5	24.0	1.88		14.80	1.069		355.20	43.911	
15/57	1	17.0	1.88		9.50	1.069		161.70	43.911	
15/57	2	16.5	1.88		10.90	1.069		179.65	43.911	
15/57	3	25.0	1.88		17.25	1.069		431.25	43.911	
15/57	5	18.0	2.66		11.30	1.512		203.40	62.099	
15/58	4	15.0	2.66		10.20	1.512		153.00	62.099	
15/58	5	20.0	2.66		13.40	1.512		268.00	62.099	
2/23	1	22.5	1.88		14.40	1.069		324.25	43.911	
2/23	2	28.5	1.88		16.20	1.069		461.70	43.911	
2/23	3	21.0	2.66		14.00	1.512		294.00	62.099	
2/23	4	21.0	1.88		13.90	1.069		292.30	43.911	
2/23	5	22.5	1.88		14.55	1.069		327.45	43.911	
2/33	1	24.0	1.88		15.10	1.069		363.00	43.911	
2/33	2	19.5	1.88		13.00	1.069		260.15	43.911	
2/33	3	20.5	1.88		12.70	1.069		260.20	43.911	
2/33	4	21.5	1.88		12.20	1.069		272.20	43.911	
2/33	5	25.0	1.88		15.95	1.069		401.85	43.911	
2/36	1	14.0	2.66		8.40	1.512		117.60	62.099	
2/36	2	19.5	1.88		13.55	1.069		263.65	43.911	
2/36	3	13.0	2.66		9.10	1.512		118.30	62.099	
2/36	4	10.5	1.88		8.80	1.069		95.55	43.911	
2/36	5	18.5	1.88		12.65	1.069		237.00	43.911	
24/4	1	13.0	2.66		8.20	1.512		106.60	62.099	
24/4	2	16.0	1.88		10.05	1.069		166.95	43.911	
24/4	3	27.5	1.88		16.60	1.069		456.50	43.911	
24/4	4	20.0	2.66		11.60	1.512		232.00	62.099	
24/4	5	15.0	1.88		10.65	1.069		159.75	43.911	
29/104	1	17.0	2.66		9.10	1.512		154.70	62.099	
29/104	2	9.0	2.66		6.50	1.512		58.50	62.099	
29/104	3	19.0	1.88		11.25	1.069		214.50	43.911	
29/104	4	22.0	1.88		13.10	1.069		288.10	43.911	

29/104	5	18.5	1.88	11.75	1.069	218.80	43.911
29/4	1	18.5	1.88	9.40	1.069	173.90	43.911
29/4	2	15.5	1.88	9.55	1.069	150.40	43.911
29/4	3	25.0	1.88	15.05	1.069	376.30	43.911
29/4	4	26.5	1.88	17.35	1.069	460.65	43.911
29/4	5	12.0	2.66	7.10	1.512	85.20	62.099
29/5	1	15.0	2.66	9.60	1.512	144.00	62.099
29/5	2	18.5	1.88	14.50	1.069	272.25	43.911
29/5	3	17.0	2.66	11.80	1.512	200.60	62.099
29/5	4	27.5	1.88	18.75	1.069	519.50	43.911
29/5	5	21.0	1.88	13.40	1.069	281.70	43.911
33/36	1	19.0	1.88	12.20	1.069	231.70	43.911
33/36	2	22.0	1.88	12.40	1.069	272.40	43.911
33/36	3	22.0	1.88	12.55	1.069	276.35	43.911
33/36	4	21.5	1.88	14.70	1.069	324.45	43.911
33/36	5	19.0	2.66	19.80	1.512	376.20	62.099
33/87	1	16.0	2.66	8.50	1.512	136.00	62.099
33/87	2	23.5	1.88	15.50	1.069	364.30	43.911
33/87	3	20.0	1.88	11.50	1.069	230.00	43.911
33/87	4	24.0	1.88	14.90	1.069	358.70	43.911
33/87	5	20.0	2.66	11.60	1.512	232.00	62.099
7/86	1	16.0	1.88	10.10	1.069	161.60	43.911
7/86	2	20.0	1.88	14.70	1.069	298.50	43.911
7/86	3	21.0	1.88	12.00	1.069	252.00	43.911
7/86	4	24.0	2.66	13.50	1.512	324.00	62.099
Argyle	1	17.5	1.88	9.95	1.069	176.50	43.911
Argyle	2	18.0	2.66	11.50	1.512	207.00	62.099
Argyle	3	21.0	1.88	12.75	1.069	273.55	43.911
Argyle	4	17.0	1.88	10.20	1.069	178.50	43.911
Argyle	5	37.5	1.88	19.55	1.069	733.70	43.911
Cromarty	1	12.0	2.66	8.10	1.512	97.20	62.099
Cromarty	2	25.0	1.88	15.70	1.069	397.50	43.911
Cromarty	3	22.5	1.88	14.35	1.069	324.15	43.911
Cromarty	5	16.0	1.88	10.60	1.069	169.60	43.911
Dudley	1	19.0	1.88	11.60	1.069	220.80	43.911
Dudley	2	20.0	2.66	9.50	1.512	190.00	62.099
Dudley	3	21.0	2.66	11.60	1.512	243.60	62.099
Dudley	4	22.0	1.88	13.25	1.069	307.40	43.911
Dudley	5	23.0	1.88	14.50	1.069	338.30	43.911
Eastwood	1	19.5	1.88	10.50	1.069	204.40	43.911
Eastwood	2	14.0	2.66	10.10	1.512	141.40	62.099
Eastwood	3	18.5	1.88	11.65	1.069	215.55	43.911
Eastwood	4	15.0	2.66	9.60	1.512	144.00	62.099
Eastwood	5	22.0	2.66	13.90	1.512	305.80	62.099
Eridano	5	15.0	1.88	8.50	1.069	127.50	43.911
Flevo	1	21.5	1.88	10.15	1.069	220.05	43.911
Flevo	2	18.0	2.66	10.70	1.512	192.60	62.099
Flevo	3	26.5	1.88	15.40	1.069	408.00	43.911
Flevo	4	28.0	2.66	13.30	1.512	372.40	62.099
Flevo	5	19.0	2.66	7.50	1.512	142.50	62.099
Fraser	2	10.0	2.66	10.60	1.512	106.00	62.099
Fraser	4	19.0	1.88	16.60	1.069	318.20	43.911
Fraser	5	18.5	1.88	12.05	1.069	223.00	43.911
Henley	1	20.0	2.66	10.90	1.512	218.00	62.099
Henley	2	18.0	1.88	13.20	1.069	237.60	43.911

Henley	3	22.0	1.88	16.70	1.069	369.00	43.911
Henley	4	26.0	1.88	18.45	1.069	479.85	43.911
Henley	5	17.0	1.88	13.25	1.069	225.25	43.911
Kainga	1	14.5	1.88	9.60	1.069	139.65	43.911
Kainga	2	16.5	1.88	11.05	1.069	184.20	43.911
Kainga	4	19.0	2.66	12.10	1.512	229.90	62.099
Kainga	5	24.5	1.88	16.70	1.069	409.75	43.911
Kilmog	2	24.5	1.88	14.95	1.069	367.85	43.911
Kilmog	3	21.0	1.88	11.50	1.069	242.10	43.911
Kilmog	4	17.5	1.88	10.40	1.069	182.40	43.911
Kilmog	5	18.5	1.88	10.35	1.069	191.40	43.911
Margarita	1	15.0	1.88	8.85	1.069	132.75	43.911
Margarita	2	16.5	1.88	11.50	1.069	190.05	43.911
Margarita	3	20.5	1.88	12.00	1.069	248.25	43.911
Margarita	4	22.0	1.88	13.30	1.069	293.20	43.911
Margarita	5	25.5	1.88	15.45	1.069	397.60	43.911
Otahuao	1	16.0	1.88	8.55	1.069	137.45	43.911
Otahuao	2	21.0	1.88	12.55	1.069	263.45	43.911
Otahuao	3	19.0	1.88	10.35	1.069	196.65	43.911
Otahuao	4	23.0	1.88	13.75	1.069	317.00	43.911
Otahuao	5	24.5	1.88	13.00	1.069	318.75	43.911
Pakaraka	1	18.5	1.88	11.05	1.069	208.30	43.911
Pakaraka	2	16.5	1.88	12.20	1.069	202.50	43.911
Pakaraka	3	20.5	1.88	14.00	1.069	287.10	43.911
Pakaraka	4	22.0	2.66	14.90	1.512	327.80	62.099
Pakaraka	5	21.5	1.88	13.15	1.069	284.60	43.911
Selwyn	1	15.5	1.88	10.50	1.069	162.95	43.911
Selwyn	2	16.0	2.66	10.30	1.512	164.80	62.099
Selwyn	3	23.0	1.88	15.30	1.069	353.50	43.911
Selwyn	4	23.0	1.88	17.95	1.069	412.80	43.911
Selwyn	5	16.5	1.88	11.25	1.069	185.85	43.911
Tasman	2	17.0	1.88	10.35	1.069	176.10	43.911
Tasman	3	21.0	1.88	14.30	1.069	300.30	43.911
Tasman	4	20.0	1.88	12.60	1.069	252.00	43.911
Tasman	5	30.0	2.66	17.80	1.512	534.00	62.099
Veronese	1	12.5	1.88	7.80	1.069	96.90	43.911
Veronese	2	22.5	1.88	12.85	1.069	289.00	43.911
Veronese	3	20.0	1.88	12.60	1.069	253.10	43.911
Veronese	4	20.0	2.66	12.80	1.512	256.00	62.099
Veronese	5	22.0	1.88	13.15	1.069	294.40	43.911
Weraiti	2	23.0	1.88	15.40	1.069	354.20	43.911
Weraiti	3	25.0	2.66	12.90	1.512	322.50	62.099
Weraiti	4	24.0	1.88	14.15	1.069	340.95	43.911