

FRI Project Record

No. 4713

**TRIALS DESIGNED TO QUANTIFY GROWTH AND YIELD GAINS
FROM GENETICALLY IMPROVED RADIATA PINE
-- SECOND REVISION --**

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REPORT No 40.

JUNE 1995

N.B. This addendum replaces all Tables and Appendices in Stand Growth Modelling Cooperative Report No. 24 and No 24a.

FRI/INDUSTRY RESEARCH COOPERATIVES

EXECUTIVE SUMMARY

Stand Growth Modelling Cooperative Report No. 24 (October 1991) outlined the permanent sample plots in genetic trials being supported by the Cooperative. Details of trial design, including experimental design, silviculture and seedlots were presented in a series of Tables and Appendices. Report No 24a (March 1994) documented modifications and corrections which were made between 1991 and 1994.

This report gives another updated overview of all trials supported by the Cooperative and documents current plans for these trials, establishment information to date and modifications in trial designs since previous reports. It presents a comprehensive summary of the status of all trials and permanent sample plots as of June 1995.

This addendum replaces all Tables and Appendices in Stand Growth Modelling Cooperative Report No. 24 and the 1st revision, Report No. 24a.

1. INTRODUCTION

Measurement and establishment of permanent sample plots (PSP's) has progressed on schedule since issue of Report 24a. However, some further modifications have been desirable and are noted in this report. Documentation of the current status for each trial is presented in a set of Appendices 1-30 (an update of Stand Growth Modelling Cooperative Report No. 24a). In addition, appropriate tables from Report 24 have been updated and are included in this report. Representation of PSP plots in the framework for a 'core' PSP growth database for each growth modelling region, outlined in Section 3, is also included.

2. OVERVIEW OF COOPERATIVE TRIALS

PSPs in genetic gain trials represent a wide range of regions and sites, as well as valid statistical comparisons among seedlots and silvicultural treatments. The silviculture/breed trials have been planted to represent a matrix of site qualities, regions, breeds and treatments (Table 1).

The trial design of this series falls into two categories:

- Plots superimposed on existing trials (Tables 2a, 2b & 2c).
- Plots designed with a wide range of spacing treatments, planted specifically for provision of genetic gain data for growth models (Tables 3a & 3b).

A summary of the site categories and GF ratings of seedlots represented in all of the trials is presented in Table 4. The silviculture, planting stock and measurement information is detailed for each trial in Appendices 1-30.

The statistical analysis ANOVA tables (Appendices 23-29 in Report 24a) have not been redone to accommodate the changes made to the silviculture/breed trials. These tables will be reviewed when data analysis begins.

3. FRAMEWORK FOR A 'CORE' PSP GROWTH DATABASE

Permanent sample plots provide data to form a robust growth modelling response surface.

The PSP Future Strategy Report (Hayward, et al., 1991) sets down a framework for a PSP database which is intended to provide the 'core' information for growth modelling for each defined site class over a range of different silvicultural options. The currently defined growth modelling regions can be considered as aggregations of forests with similar site qualities, consequently these regions can be defined as one such site class.

Full documentation of each growth modelling region, by initial stocking class, is presented in Tables 5-12. The coverage of plots within this matrix was previously documented in Report 24a for the Central North Island growth modelling region only. The Cooperative trials only represent three of the initial stocking ranges; <500, 500-900 and 900-1800 stems/ha. The matrix representing plots with an initial stocking greater than 1800 stems/ha was not represented. Table 13 shows the categories which are included in this core framework.

The GF rating, the number of plots, the location of plots, and their position in the matrix of silvicultural options is provided for, again including the Central North Island, the following regions:

Auckland Clays	- Tables 5a-5c.
North Island Sands	- Tables 6a-6c.
Central North Island Pumice Plateau	- Tables 7a-7c.
East Coast	- Tables 8a-8c.
Hawkes Bay	- Tables 9a-9c.
Nelson	- Tables 10a-10c.
Canterbury	- Tables 11a-11c.
Southland	- Tables 12a-12c.

These tables show that while the Cooperative PSP plots do not provide a comprehensive coverage of all options included in the matrices, a relatively wide range is represented for most regions.

4. MODIFICATIONS IN COOPERATIVE TRIALS

Changes in Silvicultural Treatments

Two additional treatments have been added to Silviculture/breed trials FR77 and FR78. These trials originally had three replications of each treatment (pruned and thinned from 500 stems/ha to 400 and 200 stems/ha). Two additional silvicultural treatments have been added with one replication in each, by reducing the number of replications of the original treatments from three to two;

- 1) unpruned and unthinned
- 2) pruned with a late thinning to 200 stems/ha at 20m MCH.

This is documented in Appendices 20 and 21.

Changes in Measurement Schedule

In order to minimise the cost of re measurement but maximise the pool of genetic gain data available, it has been decided that all trials will receive annual re measurements up to and including age 20, followed by 2/3 yearly re measurements. The projected work programme to the year 2000 (Table 14) shows when these new schedules begin and how they affect the time required for re measurement.

The initial stocking trial, RO 972, planted in 1970 and the 1975 planted 850 Polycross trials will be measured in 1995/96 financial year followed by three yearly re measurements. The 1978 planted Genetic Gain trials will be measured annually up to 1998/99 and then put on a two yearly re measurement schedule.

Unscheduled Silvicultural Treatments

Treatment 6 (pruned with a production thin at 20m MCH) no longer exists in the two Silviculture/breed trials FR8 (Tahorakuri) and FR10 (Glengarry). Eight plots at each trial were thinned in error at plot establishment (MCH 6.2m), which means these plots are now equivalent to Treatment 2 (Appendices 11 and 13).

The Silviculture/breed trial FR8, was given an unscheduled 2nd prune by Tasman Forestry staff. All trees in the pruned plots were given a variable height prune to leave 4m of crown (Appendix 11). The average prune height of the pruned plots is now 4.5m. A plot (treatment 5a) which was to have been unpruned was also pruned in error by Tasman Forestry staff.

In addition, unscheduled thinning of two 'core' plots in trial FR8 occurred during the regeneration cutting before plot establishment (Appendix 11). One plot (treatment 4a) was thinned to 400 stems/ha instead of 600 stems/ha. The other plot (treatment 3a) was thinned to 500 stems/ha. This plot was thinned to 400 stems/ha at the time of plot establishment as per the original plan.

Plots abandoned or not established

Several plots in the Silviculture/breed trials did not have PSP plots established or they were abandoned at a later stage for various reasons. The following trials have been affected:

Trial	Location	No. Plots	Reason for Abandonment
FR 11	Ditchlings	1	unusual spacing and mortality problem
FR 11	Ditchlings	1	trees felled after establishment due to power lines
FR 12	Otago Coast	1	not established, unable to distinguish plot trees
FR 56	Dalethorpe	1	unusual spacing and mortality
FR 56	Dalethorpe	5	poor tree quality and mortality
FR 57	Tikokino	2	high mortality
FR 77	Tikokino	1	unable to locate plot trees
FR 78	Gwavas	12	high mortality (root trainer and directly planted field cuttings had a very low survival rate)

Full details of these plots are documented in their respective appendices.

Trials Abandoned

Three trials, FR58, FR59 and FR60 have been abandoned, in 1995, as part of the Cooperative trial re measurement programme. These trials do not have any genetic comparison, therefore they are unsuitable for genetic gain analysis. The trials may continue to be measured for inclusion in a pool of general growth data for growth modelling improved breed Radiata stock.

Alteration of treatment numbers

Silviculture/breed trial FR55 (Eyrewell) has had the original treatment numbers reallocated to a more logical sequence for establishment and numbering of PSP plots (Appendix 18).

Late Thinning Treatments

There are twelve trials with plots requiring a late thinning. These will be carried out, at the appropriate time, by FRI staff.

In order to standardise the size of trees and emulate a production thinning, all late thinnings have been scheduled for a MCH of 20m. The 1984 initial stocking trial (RO1897) schedule has been changed from an 18m MCH, the 1987 and 1988 silviculture/breed trials have been changed from 20-25m MCH, and two 1989 silviculture/breed trials (FR84 & FR85) changed from 12-14m MCH.

The first of these thinnings is estimated to be due in 1997. Table 14 schedules the late thinnings required, giving an estimated date of thinning. This will need to be revised after each annual re measurement using the current age and MCH.

5. WORK PROGRAMME FOR COOPERATIVE TRIALS

A work programme (Table 15) for all the Cooperative trials, projects the input required for re measurement and establishment for the years 1994 to 2000. The manweeks of work include those for NZFRI staff only. Numbers do not reflect 'in kind' contributions of industry field staff. The current table shows that input required from FRI will reach a plateau of around 75 manweeks in 1997/98.

This table will be reviewed following the measurement season each year and adjusted where necessary to reflect the actual time taken in the previous season.

6. PROCEDURES FOR PSP PLOT ESTABLISHMENT

Standard methods (Ellis et al., 1991) are used for establishment and annual re measurement of PSP plots unless otherwise specified in establishment Reports.

A full establishment report (Skinner, Dunlop, Carson; 1994) for the 1987 planted Silviculture/breed trials has been completed. Further such reports, by planting year, will be completed when plot establishment is complete for each group of trials. Reports are in progress for the 1988 and 1989 plantings.

The following procedures are standard for establishment of the silviculture/breed plots:

- 1) Plots not requiring pruning and thinning are surrounded with flagging tape.
- 2) Pruning (to leave 4m crown remaining) is carried out by a contract gang organised by the forest owner concerned and supervised by FRI Mensuration field crews.
- 3) PSP's are established under the direction of FRI Mensuration field crews, who check that the correct number of trees have been pruned and will remain after thinning. At establishment DBH of all trees is measured, and total height, and if applicable, pruned height, DOS, DOS height and maximum branch diameter of twelve selected height trees.
- 4) Plots that require thinning are thinned immediately following plot establishment by FRI Mensuration field crews.
- 5) PSP's are measured annually up to and including age 20 (Table 15) under the direction of FRI Mensuration field crew.

At an annual re measurement, measurements are taken of DBH for all trees and total height and crown height for the twelve selected height trees (this includes the four predominant height trees). Trees are coded for any damage or irregular form.

References:

- Ellis, J.C., Dunlop, J.D., August 1991: Minimum standards for collection of growth data from Permanent Sample Plots. Stand Growth Modelling Cooperative Report No. 4.
- West, G., Rawley, B., Goulding, C., Hayward, W., June 1991: PSP Future Strategy Committee Report. Stand Growth Modelling Cooperative Report No. 22.
- Carson, S., Carson, M., Wilcox, P., Kimberley, M., November 1991: Trials designed to quantify growth yield gains from genetically improved Radiata pine. Stand Growth Modelling Cooperative Report No. 24.
- Skinner, J., Carson, S., March 1994: Appendices to Report 24 - An Update. Stand Growth Modelling Cooperative Report No. 24a.
- Skinner, J., Dunlop, J., Carson, S., June 1994: Establishment report for the 1987 Silviculture/Breeds trials. Stand Growth Modelling Cooperative Report No. 32.

TABLE 1.

Planting year for **Silvicultural/Breed Trials**
representing a matrix of regions and site categories

Region	Site category ¹⁾			
	High basal area	High site index	Medium site index	Low site index
Auckland clays	'88	'90	'90	
Sands	NA ²⁾	NA	'87	'91
Central North Island	'89	'90	'87 , '89 , '90	'87
Hawkes Bay	'87	'88 , '89	'89	'90
East Coast	'90		'91	
Nelson		'91	'89	'87
Southland	'87	'90		'91
Canterbury	NA	'91	'88	'88 , '91

1) Classifications apply **within** Regions

2) NA = not applicable

TABLE 2a. Genetic Gain Trials supported by the Stand Growth Modelling Cooperative and established in existing GTI trials.
Location details

PSP Expt No.	Planted Trial No.	Trial name	Forest name	Forest code	Cpt No.	Forest Owner (as @ 1995)
RO972	R972	EFM Init. crop stocking	Rotoehu	ROEU	122	Forestry Corporation of NZ Ltd
AK1056	622/1	GTI 850 polycross	Woodhill	WOOD	225, 230, 231	Carter Holt Harvey Forests Ltd
RO2098	RO1664/1	GTI 850 polycross	Kaingaroa	KANG	327	Forestry Corporation of NZ Ltd
NN529/1	N330/1	GTI 850 polycross	Golden Downs West	GDNW	345	Tasman Forestry Ltd
CY597	C463	GTI 850 polycross	Eyrewell	EYWL	32	Carter Holt Harvey Forests Ltd
AK1058	A772/1	GTI 1978 genetic gain	Aupouri	AUPO	92	Juken Nissho Ltd
RO2103/1	RO1664/1	GTI 1978 genetic gain	Kaingaroa	KANG	1210	Forestry Corporation of NZ Ltd
RO2103/2	RO1664/2	GTI 1978 genetic gain	Kaingaroa	KANG	1210	Forestry Corporation of NZ Ltd
WN377	WN305	GTI 1978 genetic gain	Mohaka	MOHA	205	Carter Holt Harvey Forests Ltd
NN530/2	N405/1	GTI 1978 genetic gain	Golden Downs East	GDNE	66	Tasman Forestry Ltd
CY421	CY421/1	GTI 1978 genetic gain	Waimate	WMTE	2	Timberlands NZ Ltd
SD564/1	SD564/1	GTI 1978 genetic gain	Longwood	LONG	62	Rayonier NZ Ltd
SD564/2	SD564/2	GTI 1978 genetic gain	Longwood	LONG	62	Rayonier NZ Ltd
NN530/1	N405/4	GTI 1979 genetic gain	Golden Downs West	GDNW	26	Tasman Forestry Ltd
RO2013/3	RO1664/6	GTI 1979 genetic gain	Kaingaroa	KANG	1218	Forestry Corporation
SD682	S425/2	GTI 1979 genetic gain	Dean	DEAN	251	Timberlands NZ Ltd
FD58	A923	G. Will best practices	Riverhead	RVHD	16	Carter Holt Harvey Forests Ltd
FR59	A858	GTI 880 progeny test	Moerewa Block	MOER	0	Carter Holt Harvey Forests Ltd
FR60	A922	GTI Pair Cross	Weiti	WEIT	0	Carter Holt Harvey Forests Ltd
RO1897	RO1897	GTI 1984 genetic gain	Kaingaroa	KANG	327	Forestry Corporation of NZ Ltd

TABLE 2b. Genetic Gain Trials supported by the Stand Growth Modelling Cooperative and established in existing GTI trials
Planting details

PSP Expt No.	Planted trial No.	Trial Name	Region	Site category ¹⁾	Planting workplan	Mth/year planted	Reports/publications ²⁾
RO972	R972	EFM Init crop stocking	Central North Island	High SI	604	7/70	PR1560, PR2501, PR2013, James (1979)
AK1056	A622/1	GTI 850 polycross	Sands	Med SI	GTI2095	7/75	WP1379, PR91, PR944, PR35, PR2013
RO2098	RO1664/1	GTI 850 polycross	Central North Island	Med SI	GTI2095	7/75	WP1379, PR91, PR944, PR35, PR2013
NN529/1	N330/1	GTI 850 polycross	Nelson	Low SI	GTI2095	7/75	WP1379, PR91, PR944, PR35, PR2013
CY597	C463	GTI 850 polycross	Canterbury	Low SI	GTI2095	6/75	WP1379, PR91, PR944, PR35, PR2013
AK1058	A772/1	GTI 1978 genetic gain	Sands	Low SI	GTI20212	8/78	WP1448, PR1689, PR478, PR2013
RO2103/1	RO1664/1	GTI 1978 genetic gain	Central North Island	High SI	GTI20212	7/78	WP1448, PR1689, PR478, PR2013
RO2103/2	RO1664/2	GTI 1978 genetic gain	Central North Island	High SI	GTI20212	7/78	WP1448, PR1689, PR478, PR2013
WN377	WN305	GTI 1978 genetic gain	Hawkes Bay	High BA	GTI20212	7/78	WP1448, PR1689, PR478, PR2013
NN530/2	N405/1	GTI 1978 genetic gain	Nelson	Med SI	GTI20212	8/78	WP1448, PR1689, PR478, PR2013
CY421	CY421/1	GTI 1978 genetic gain	Canterbury	Med SI	GTI20212	8/78	WP2071, PR1689, PR478, PR2013
SD564/1	SD465/1	GTI 1978 genetic gain	Southland	High BA	GTI20212	8/78	WP2071, PR1689, PR478, PR2013
SD564/2	SD564/2	GTI 1978 genetic gain	Southland	High BA	GTI20212	8/78	WP2071, PR1689, PR478, PR2013
NN530/1	N405/4	GTI 1979 genetic gain	Nelson	Med SI	GTI20177	8/79	WP1448, PR1633, PR2013
RO2103/3	RO1664/6	GTI 1979 genetic gain	Central North Island	High SI	GTI20177	7/79	WP1448, PR1633, PR2013
SD682	S425/2	GTI 1979 genetic gain	Southland	Med SI	GTI20177	8/80	WP1448, PR1633, PR2013
FR58	A923	G. Will best practices	Auckland Clays	High SI	1984	7/82	WP1242, PR1496, PR2138
FR59	A858	GTI 880 progeny test	Auckland Clays	Low SI & Med SI	1242	7/82	WP1242, PR1496, PR21389, WP1772, PR2282, PR2232, WP1503, Johnson & Burdon (1989)
FR60	A922	GTI Pair Cross	Auckland Clays	High BA	GTI20022	7/82	
RO1897	RO1897	GTI 1984 genetic gain	Central North Island	Med SI	GTI20284	7/84	

1) SI = site index; BA = basal area

2) PR = FRI Project Record or Internal Report (many are also FRI/Industry Research Cooperative Reports);
WP = Work Plan; GTI = Genetics and Tree Improvement

TABLE 2c. Genetic Gain Trials supported by the Stand Growth Modelling Cooperative and established in existing GTI trials
PSP details

PSP expt. No.	Planted trial no.	Trial name	Type of comparison	No. plots	PSP estab workplan	PSP estab date	1st Assessment ¹⁾	Measurement schedule	Exp. design (Appendix)
RO972	R972	EFM Init Crop Stocking	Init stocking/breeds	16	604	5/75	6/76 (H, D)	Alt years	1
AK1056	A622/1	GTI 850 polycross	Final crop stocking	24	1379	2/86	4/86 (H, D)	Alt years	2
RO2098	RO1664/2	GTI 850 polycross	Final crop stocking	24	1379	1/86	6/86 (H, D)	Alt years	2
NN529/1	N330/1	GTI 850 polycross	Final crop stocking	24	1379	2/86	5/86 (H, D)	Alt years	2
CY597	C463	GTI 850 polycross	Final crop stocking	24	1379	3/86	5/86 (H, D)	Alt years	2
AK1058	A772/1	GTI 1978 genetic gain	Genetic gain	18 ²⁾	1448	8/86	8/86 (H, D)	Yearly to 1998	3
RO2103/1	RO1664/1	GTI 1978 genetic gain	Genetic gain	24 ²⁾	1448	8/86	7/86 (H, D)	Yearly to 1998	3
RO2103/2	RO1664/2	GTI 1978 genetic gain	Genetic gain	24 ²⁾	1448	8/86	7/86 (H, D)	Yearly to 1998	4
WN377	WN305	GTI 1978 genetic gain	Genetic gain	18 ²⁾	1448	8/86	10/86 (H, D)	Yearly to 1998	3
NN530/2	N405/1	GTI 1978 genetic gain	Genetic gain	18 ²⁾	1448	8/86	9/86 (H, D)	Yearly to 1998	3
CY421	CY421/1	GTI 1978 genetic gain	Genetic gain	12	2071	12/91	5/92 (H, D)	Yearly to 1998	3
SD564/1	SD564/1	GTI 1978 genetic gain	Genetic gain	12	2071	12/91	5/92 (H, D)	Yearly to 1998	3
SD564/2	SD564/2	GTI 1978 genetic gain	Genetic gain	12	2071	12/91	5/92 (H, D)	Yearly to 1998	4
NN530/1	N405/4	GTI 1979 genetic gain	Genetic gain	24	1448	9/86	9/86 (H, D)	Yearly	5
RO2103/3	RO1664/6	GTI 1979 genetic gain	Genetic gain	20	1448	4/86	11/86 (H, D)	Yearly	5
SD682	S425/2	GTI 1979 genetic gain	Genetic gain	19	1448	6/86	7/86 (H, D)	Yearly	5
FR58	A923	G. Will best practices	Silviculture	6 ³⁾	1242	1/88	1/88 (H, D)	Yearly to 1994	6
FR59	A858	GTI 880 progeny test	Silviculture/site	6 ³⁾	1242	4/88	4/88 (H, D)	Yearly to 1994	7
FR60	A922	GTI Pair Cross	Final crop stocking	12 ³⁾	20022	1/88	1/88 & 11/88 (H, D)	Yearly to 1994	8
RO1987	RO1987	GTI 1984 genetic gain	Genetic gain	66	20284	1/90	1/90 (H, D) ⁴⁾	Yearly	9

1) H, D = height, diameter

2) See Table 2d for details of plot establishment

3) All plots abandoned in 1995.

4) Twelve plots of the 66 were established and measured in 1991. See Appendix 9 for details

TABLE 3a. Silviculture/Breed Trials supported by the Stand Growth Modelling Cooperative
Location details

Trial No.	Planting year	Forest	Forest code	Cpt	Forest Owner (as @ 1995)	Region	Site category
FR7	87	Woodhill	WOOD	86	Carter Holt Harvey Forests Ltd	Sands	Med SI
FR8	87	Tahorakuri	TAHO	0	Tasman Forestry Ltd	Central North Island	Med SI
FR9	87	Kaingaroa	KANG	481	Forestry Corporation of NZ Ltd	Central North Island	Low SI
FR10	87	Glengarry Station	GLNG	0	Carter Holt Harvey Forests Ltd	Hawkes Bay	High BA
FR11	87	Ditchlings	DTLG	0	Tasman Forestry Ltd	Nelson	Low SI
FR12	87	Otago Coast	OTCO	170	Wenita Forestry	Southland	High BA
FR54	88	Mamaranui	MMRN	0	Carter Holt Harvey Forests Ltd	Auckland Clays	High BA
FR55	88	Eyrewell	EYWL	33	Carter Holt Harvey Forests Ltd	Canterbury	Low SI
FR56	88	Dalethorpe	DALE	0	Selwyn Plantation Board	Canterbury	Med SI
FR57	88	Tikokino Seed Orchard	TIKO	0	NZ FRI	Hawkes Bay	High SI
FR77	89	Tikokino Seed Orchard	TIKO	0	NZ FRI	Hawkes Bay	High SI
FR78	89	Gwavas Seed Orchard	GWAV	59	Carter Holt Harvey Forests Ltd	Hawkes Bay	Med SI
FR84	89	Kawerau	KAWA	0	Caxton Forests Ltd/P.F. Olsen Ltd	Central North Island	High BA
FR85	89	Kaingaroa	KANG	1187	Forestry Corporation of NZ Ltd	Central North Island	Med SI
FR86	89	Golden Downs West	GDNW	112	Tasman Forestry Ltd	Nelson	Med SI
FR121/1	90	Tungrove (Mangakahia)	TUNG	C3148	Carter Holt Harvey Forests Ltd	Auckland Clays	Med SI
FR121/2	90	Atiamuri	ATIA	A7316	Carter Holt Harvey Forests Ltd	Central North Island	Med SI
FR121/3	90	Gwavas	GWAV	45	Carter Holt Harvey Forests Ltd	Hawkes Bay	Low SI
FR121/4	90	Tairua	TIRU	120	Carter Holt Harvey Forests Ltd	Auckland Clays	High SI
FR121/5	90	Hokonui	HOKO	3	Rayonier NZ Ltd	Southland	High SI
FR121/6	90	Tarawera	P.TA	30	Tasman Forestry Ltd	Central North Island	High SI
FR121/7	90	Huanui	HNUI	18	Tasman Forestry Ltd	East Coast	High BA
FR121/8	91	Mangatu	MANT	10	Rayonier NZ Ltd	East Coast	Med SI
FR121/9	91	Santoft	SANT	108	Ernslaw One Ltd	Sands	Low SI
FR121/10	91	Blue Mountains (Conical Hill/Tapanui)	BLUE	325	Ernslaw One Ltd	Southland	Low SI
FR121/11	91	Shellocks	SELW	36/01	Selwyn Plantation Board	Canterbury	Low SI
FR121/12	91	Ashley	ASHY	19/05	Carter Holt Harvey Forests Ltd	Canterbury	High SI
FR121/13	91	Golden Downs East	GDNE	133	Tasman Forestry Ltd	Nelson	High SI

**TABLE 3b. Silviculture/Breed Trials supported by the Stand Growth Modelling Cooperative
PSP details**

Planting year	Trial No.	Forest	Planting WP	Estab. report	No. plots	Expt. design (Appendix)	Height meas. (mth/yr)	PSP estab. (Actual/planned))
87	FR7	Woodhill	1585	PR1767	54	10	5/89	11/92
87	FR8	Tahorakuri	1585	PR1767	54	11	9/88	3/92
87	FR9	Kaingaroa	1585	PR1767	48	12	7/89	3/94
87	FR10	Glengarry Station	1585	PR1767	54	13	7/89	2/92
87	FR11	Ditchlings	1585	PR1767	48	14	8/89	1/93
87	FR12	Otago Coast	1585	PR1767	48	15	8/89	3/94
88	FR54	Mamaranui	1633	PR2540	44	16	5/90	10/92
88	FR55	Eyrewell	1633	PR2540	22	17	5/90	12/94
88	FR56	Dalethorpe	1633	PR2540	44	18	5/90	3/95
88	FR57	Tikokino Seed Orchard	1633	PR2540	42	19	8/91	12/93
89	FR77	Tikokino Seed Orchard	1633	PR3544	30	20	8/91	11/94
89	FR78	Gwavas Seed Orchard	1633	PR3544	30	21	8/91	1/95
89	FR84	Kawerau	1633	PR2544	36	22	6/91	11/93
89	FR85	Kaingaroa	1633	PR2544	42	23	5/91	1/94
89	FR86	Golden Downs West	1633	PR2544	16	24	12/91	2/95
90	FR121/1	Tungrove (Mangakahia)	1633	PR2781	25	25	4/92	95/96
90	FR121/2	Atiamuri	1633	PR2781	32	26	5/92	2/95
90	FR121/3	Gwavas	1633	PR2781	22	27	6/92	95/96
90	FR121/4	Tairua	1633	PR2781	18	28	8/92	10/94
90	FR121/5	Hokonui	1633	PR2781	27	29	6/92	96/97
90	FR121/6	Tarawera	1633	PR2781	25	25	4/92	3/95
90	FR121/7	Huanui	1633	PR2781	18	28	6/92	95/96
91	FR121/8	Mangatu	1980	PR3027	25	30	12/94	95/96
91	FR121/9	Santoft	1980	PR3027	25	30	4/93	96/97
91	FR121/10	Blue Mountains (Conical Hill/Tapanui)	1980	PR3027	25	30	6/93	96/97
91	FR121/11	Shellocks	1980	PR3027	25	30	5/93	96/97
91	FR121/12	Ashley	1980	PR3027	25	30	5/93	96/97
91	FR121/13	Golden Downs East	1980	PR3027	25	30	5/93	95/96

TABLE 4. Seedlot comparisons in trials supported by the Stand Growth Modelling Cooperative

Growth modelling region	Site category	Year planted	PSP Expt. No.	Seedlot ratings	Appendix	
Auckland Clays	High SI	1982	FR58	GF14	6	
		1990	FR121/4	GF7, GF14, GF16, GF25	28	
	Med SI	1981	FR59	GF16	7	
		1990	FR121/1	GF7, GF14, GF16, GF25, LI25 (GF13)	25	
	Low SI	1981	FR59	GF16	7	
	High BA	1982	FR60	GF16	8	
		1988	FR54	GF14, GF17, GF22, LI23 (GF9)	16	
	Sands	High SI	-			
Med SI		1975	AK1056	GF13	2	
		1987	FR7	GF7, GF14, GF19, GF21, LI28 (GF13)	10	
Low SI		1978	AK1058	GF2, GF7, GF14, GF22	3	
		1991	FR121/9	GF6, GF14, GF16, GF25, LI25 (GF13)	30	
High BA		-				
Central Nth Island	High SI	1970	RO972	GF4, GF13	1	
		1978	RO2103/1	GF2, GF7, GF14, GF22	3	
	1978	RO2103/2	GF2, GF7, GF14, GF22	4		
	1979	RO2103/3	GF7, GF8, GF114, GF18, LI9 (GF8)	5		
	1990	FR121/6	GF7, GF14, GF16, GF25, LI25 (GF13)	25		
	Med SI	1975	RO2098	GF13	2	
		1984	RO1897	GF7, GF14, GF16, GF17, LI20 (GF10), LI25 (GF11)	9	
		1987	FR8	GF7, GF14, GF21, LI28 (GF13)	11	
		1989	FR85	GF5, GF16, GF18, GF22, GF23, GF25	23	
		1990	FR121/2	GF7, GF14, GF16, GF25, LI25 (GF13)	26	
		Low SI	1987	FR9	GF7, GF14, GF21, LI28 (GF13)	12
	High BA	1989	FR84	GF5, GF16, GF25	22	
		Hawkes Bay	High SI	1988	FR57	GF17, GF19, LI15 (GF10)
	1989			FR77	GF5, GF16, GF23, GF25	20
	Med SI		1989	FR78	GF5, GF16, GF23, GF25	21
	Low SI		1990	FR121/3	GF7, GF14, GF16, GF25, LI25 (GF13)	27
High BA	1978		WN377	GF2, GF7, GF14, GF22	3	
	1987		FR10	GF7, GF14, GF16, GF21, LI28 (GF13)	13	
East Coast	High SI	-				
	Med SI	1991	FR121/8	GF6, GF14, GF16, GF25, LI25 (GF13)	30	
	Low SI	-				
Nelson	High BA	1990	FR121/7	GF7, GF14, GF16, GF25	28	
	High SI	1991	FR121/13	GF6, GF14, GF16, GF25, LI25 (GF13)	30	
		Med SI	1978	NN530/2	GF2, GF7, GF14, GF22	3
		1979	NN530/1	GF7, GF8, GF14, GF18, LI19 (GF8)	5	
		1989	FR86	GF5, GF16, GF23, LI27 (GF6)	24	
	Low SI	1975	NN529/1	GF13	2	
		1987	FR11	GF7, GF14, GF21, LI28, (GF13)	14	
	High BA	-				
Southland	High SI	1990	FR121/5	GF7, GF14, GF16, GF25, LI25 (GF13)	29	
	Med SI	1980	SD682	GF7, GF8, GF14, GF18, LI19 (GF8)	5	
	Low SI	1991	FR121/10	GF6, GF14, GF16, GF25, LI25 (GF13)	30	
	High BA	1978	SD564/1	GF2, GF7, GF14, GF22	3	
		1978	SD564/2	GF2, GF7, GF14, GF22	4	
		1987	FR12	GF7, GF14, GF21, LI28 (GF13)	15	
Canterbury	High SI	1991	FR121/12	GF6, GF14, GF16, GF25, LI25 (GF13)	30	
		Med SI	1978	CY421	GF2, GF7, GF14, GF22	3
		1988	FR56	GF14, GF17, GF22, LI23 (GF9)	18	
	Low SI	1975	CY597	GF13	2	
		1988	FR55	GF16, GF17, GF22	17	
		1991	FR121/11	GF6, GF14, GF16, GF25, LI25 (GF13)	30	
	High BA	-				

**TABLE 5a. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Auckland Clays Region**

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	MOD SI Tungrove: GF7(1) GF25(1) LI25 (GF13)(1) HIGH SI Tainua: GF7(1) GF25(1) •	•	•	
150 - 225	•		•	
225 - 275		•	•	
275 - 350			•	
350 - 500				HIGH BA Mamaranui: GF17c(2)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF 17 cuttings

**TABLE 5b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Auckland Clays Region**

INITIAL STOCKING RANGE 500 - 900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	HIGH BA Mamaranui: GF16(3)	•	•	
150 - 225	MOD SI Tungrove: GF7(2) GF14(1) GF16(1) GF25(2) LI25(GF13)(2) HIGH BA Mamaranui: GF14(2) GF16(3) GF17c(2) GF22(2) LI23(GF9)(2)	•	HIGH BA Mamaranui: GF14(2) GF22(2) LI23(GF9)(2)	
225 - 275	•	•	•	
275 - 350	HIGH BA Mamaranui: GF16(3)	MOD SI Moerewa: GF16(3)	•	
350 - 500	HIGH BA Mamaranui: GF16(3)	•	•	
500 - 900				MOD SI Moerewa: GF16(3) HIGH BA Mamaranui: GF14(2) GF22(2) LI23(GF9)(2)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings

**TABLE 5c. Existing plot coverage of the framework for a "Core" PSP growth database for the SGM genetic trials
Auckland Clays Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225		•		
225 - 275	HIGH SI Tairua: GF14(3)	HIGH SI Tairua: GF14(3)		
275 - 350		•	•	
350 - 500	MOD SI Tungrove: GF7(1) GF25(1) LI25(GF13)(1) HIGH BA Manaranui: GF14(2) GF17c(2) GF22(2) LI23(GF9)(2)	HIGH SI Tairua: GF7(2) GF25(2)		
500 - 900	MOD SI Tungrove GF7(1) GF13(1) GF25(1) HIGH SI Tairua GF7(1) GF25(1)	HIGH BA Manaranui GF14(2) GF22(2) LI23(GF9)(2)		
900 - 1800				MOD SI Tungrove: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1) HIGH SI Tairua: GF7(1) GF14(1) GF16(1) GF25(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings.

**TABLE 6a. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Sands Growth Modelling Region.**

INITIAL STOCKING RANGE ≤ 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	LOW SI Santoft: GF7(I) GF25(I) LI25(GFI3)(I)	•	•	
150 - 225	•	•	•	
225 - 275		•	•	
275 - 350			•	
350 - 500				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

**TABLE 6b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gains trials
Sands Growth Modelling Region**

INITIAL STOCKING RANGE 500 - 900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	MOD SI Woodhill (86): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	MOD SI Woodhill (335): GF13(3)	MOD SI Woodhill (225): GF13(3)	
150 - 225	LOW SI Santoft: GF7(2) GF14(1) GF16(1) GF25(2) LI25(GF13)(2)	MOD SI Woodhill (86): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	MOD SI Woodhill (86): GF7(2) GF14(2) GF21(2) LI28(GF13)(2) Woodhill (225): GF13(3)	
225 - 275	•	•	•	
275 - 350	•	•	•	
350 - 500	•	MOD SI Woodhill (225): GF13(3)	MOD SI Woodhill (225): GF13(3)	
500 - 900			MOD SI Woodhill (86): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	MOD SI Woodhill (225): GF13(6)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) Brackets () after forest name denotes compartment number.

**TABLE 6c. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gain trials
Sands Growth Modelling Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225		•	•	
225 - 275				
275 - 350		LOW SI Aupouri: GF2(3) GF7(6) GF14(6) GF22(3)	•	
350 - 500	LOW SI Santoft: GF7(2) GF25(2) LI25(GF13)(2)	MOD SI Woodhill (86): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)		
500 - 900	LOW SI Santoft: GF7(1) GF25(1) LI25(GF13)(1)	MOD SI Woodhill (86): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)		
900 - 1800				LOW SI Santoft: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) Brackets () after forest name denotes compartment number

**TABLE 7a. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gain trials
Central North Island Region**

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE stems per ha)	THINNING MCH RANGE (m)			
	< 9	9-17	17>	UNTHINNED
<150	LOW SI Kaingaroa (481): GF2(2) GF14(2) GF21(2) LI28(GF13)(2)	HIGHSI Tarawera: GF7(1) GF25(1) LI25(GF13)(1) MOD SI Atiamuri: GF7(1) GF25(1) LI25(GF13)(1)		
150-225	•	•	•	
225-275		•	•	HIGHSI Kotochui: GF13(2)
275-350			•	
350-500				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) Brackets () after forest name denotes compartment number.

**TABLE 7b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gain trials
Central North Island Region**

INITIAL STOCKING RANGE 500-900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	<9	9-17	17>	UNTINNED
<150	MOD SI Tahorakuri: GF7(2) GF21(2) GF14(2) LI28(GF13)(2)	MOD SI Kaingaroa (327): GF13(3)	MOD SI Kaingaroa (327): GF13(3)	
150-225	MOD SI Tahorakuri : GF7(2) GF14(2) GF14(1) GF16(1) GF21(2) GF25(2) LI28(GF13)(2) LI25(GF13)(2)	HIGH SI Tarawera: GF7(2) GF14(1) GF16(1) GF25(2) LI25(GF13)(2)	MOD SI Kaingaroa (327): GF13(3) LOW SI Kaingaroa (481): GF7(2) GF14(2) Tahorakuri : GF7(2) GF21(2) LI28(GF13)(2) GF14(2) GF21(2) LI28(GF13)(2)	
225-275	MOD SI Kaingaroa (1187): GF5(2) GF16(2) GF18(2) GF22c(2) GF23(2) GF25c(2)	HIGH BA Kawerau: GF5(3) GF16(3) GF25c(3)	HIGH SI Rotoehu : GF13(2) GF5(2) HIGH BA Kawerau: GF5(3) GF16(3) GF25c(3)	
275-350	•	MOD SI Kaingaroa (327): GF7(3) GF14(3) GF16(3) GF16c(3) GF17(3) LI20(GF10)(3) LI25(GF11)(3)	MOD SI Kaingaroa (327): GF7(2) GF14(2) GF16(2) GF17(2) LI20(GF10)(2) LI25(GF11)(2)	
350-500	•	MOD SI Kaingaroa (327): GF7(3) GF13(3) GF14(3) GF16c(3) GF16(3) GF17(3) LI20(GF10)(3) LI25(GF11)(3)	MOD SI Kaingaroa (327): GF7(2) GF14(2) GF13(3) GF17(2) GF16(2) LI20(GF10)(3) LI25(GF11)(3)	
500-900			HIGH SI Kaingaroa (1210): GF2(6) GF7(6) GF14(6) GF22(6) MOD SI Kaingaroa (327): GF13(6) Tahorakuri: GF7(2) GF14(2) GF21(2) GF23(2) LI28(GF13)(2) HIGH BA Kawerau: GF5(3) GF16(3) GF25(3) GF25c(3) LOW SI Kaingaroa (1187): GF5(2) GF16(2) GF11(2) GF22c(2) GF21(2) GF25(2) GF25c(2)	

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF16c = cuttings; GF22c = cuttings; GF25c = cuttings.
- 4) Brackets () after forest name denotes compartment number.

**TABLE 7c. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gain trials
Central North Island Region**

INITIAL STOCKING RANGE 900-1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	<9	9-17	17>	UNTHINNED
<150		•	•	
225-275	HIGH SI Rotoehu: GF4(2) GF13(6)			
275-350	HIGH SI Kaingaroa (1210): GF2(3) GF7(6) GF14(6) GF22(3)	MOD SI Kaingaroa (1218): GF7(5) GF14(5) LI19(GF8)(5)	•	
350-500	MOD SI Tahorakuri: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	LOW SI Kaingaroa (481): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	MOD SI Tahorakuri: GF21(3)	
500-900	MOD SI Tahorakuri: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	LOW SI Kaingaroa (481): GF7(2) GF14(2) GF21(2) LI28(GF13)(2)		
900-1800		HIGH SI Tarawera: GF7(1) GF25(1) LI25(GF13)(1)	MOD SI Atiamuri: GF7(1) GF25(1) LI25(GF13)(1)	HIGH SI Tarawera: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) Brackets () after forest name denotes compartment number.

**TABLE 8a. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
East Coast Region**

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	MOD.SI Mangau: GF7(1) GF25(1) LI25(GF13)(1) •	•	•	
150 - 225	•	•	•	
225 - 275		•	•	
275 - 350			•	
350 - 500				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

**TABLE 8b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
East Coast Region**

INITIAL STOCKING RANGE 500 - 900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	•	•	•	
150 - 225	MOD SI Mangatu: GF7(2) GF14(1) GF16(1) GF25(2) LI25(2)	•	•	
225 - 275	•	HIGH BA Huanui: GF7(2) GF14(1) GF16(1) GF25(2)	•	
275 - 350	•	•	•	
350 - 500	•	•	•	
500 - 900				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

**TABLE 8c. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
East Coast Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225		•	•	
225 - 275				
275 - 350		•	•	
350 - 500	MOD SI Mangatu : GF7(2) GF25(2) LI25(GF13)(2)	HIGH BA Huanui: GF7(1) GF25(1)		
500 - 900	MOD SI Mangatu: GF7(1) GF25(1) LI25(GF13)(1)	HIGH BA Huanui: GF7(1) GF25(1)		
900 - 1800				MOD SI Mangatu: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1) HIGH BA Huanui: GF7(1) GF14(1) GF16(1) GF25(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

**TABLE 9a. Existing plot coverage of the framework for a "Core" PSP growth database for the SGM genetic trials
Hawkes Bay Region**

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	HIGH SI Tikokino: GF17c(2) GF19(2) LI15(GF10)(2) LOW SI Gwavas (45): GF7(1) GF25(1) LI25(GF13)(1)	•	•	
150 - 225	•	•	•	
225 - 275		•	•	
275 - 350			•	
350 - 500				HIGH SI Tikokino: GF17(1) GF19(2) LI15(GF10)(2)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings.
- 4) Brackets () after forest name denotes compartment number.

**TABLE 9b. Existing plot coverage of the framework of a "Core" PSP growth database for the SGM genetic trials
Hawkes Bay Region**

INITIAL STOCKING RANGE 500 - 900						
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)					
	< 9	9 - 17	> 17	UNTHINNED		
<150	HIGH BA Glengarry: GF7(2) GF21(2) GF14(2) GF28(2)	•	•			
150 - 225	HIGH BA Glengarry: GF7(4) GF14(4) GF21(4) LI28(GF13)(4) LI25(GF13)(2) HIGH SL Tikokino: GF5(2) GF16(2) GF23(2) GF25(2) GF25c(2) GF17c(2) GF19(2) LI15(GF10)(2) MOD SL Gwavas (59): GF5(3) GF16(3) GF23c(3) GF25(3) LOW SI Gwavas (45): GF7(2) GF14(1) GF16(1) GF25(2)	•	HIGH SL Tikokino: GF17(2) GF19(2) LI15(GF10)(2) GF5(1) GF16(1) GF23c(1) GF25(1) GF25c(1) DFC(1) MOD SI Gwavas (59): GF5(1) GF16(1) GF23c(1) GF25(1)			
225 - 275	•	•	•			
275 - 350	•	•	•			
350 - 500	HIGH SI Tikokino: GF5(3) GF16(3) GF23(3) GF25(3) GF25c(3) DFC(3) MOD SI Gwavas (59): GF5(2) GF16(2) GF23(2) GF25(2)			•		
500 - 900				HIGH BA Glengarry: GF7(2) GF14(2) GF21(2) LI28(GF13)(2) HIGH SI Tikokino: GF5(1) GF16(1) GF23c(1) GF25(1) GF25c(1) DFC(1) GF17c(1) GF19(2) LI15(GF10)(2) MOD SI Gwavas (59): GF5(1) GF16(1) GF23c(1) GF25(1)		

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings; GF23c = GF23 cuttings; GF25c = GF25 cuttings; DFC = directly planted field cuttings.
- 4) Brackets () after forest name denotes compartment number.

**TABLE 9c. Existing plot coverage of the framework of a "Core" PSP growth database for the SGM genetic trials
Hawkes Bay Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225		•	•	
225 - 275				
275 - 350		HIGH BA Mohaka: GF2(3) GF7(6) GF14(6) GF22(3)	•	
350 - 500	LOW SI Gwavas(45): GF7(1) GF25(1) LI25(GF13)(1) HIGH SI Tikokino: GF17c(2) GF19(2) LI15(GF10)(2) HIGH BA Glengarry: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)			
500 - 900	LOW SI Gwavas (45): GF7(1) GF25(1) LI25(GF13)(1) HIGH SI Tikokino: GF17c(2) GF19(1) LI15(GF10)(2) HIGH BA Glengarry: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)			
900 - 1800				LOW SI Gwavas (45): GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings; GF23c = GF23 cuttings; GF25c = GF25 cuttings; DFC = directly planted field cuttings.
- 4) Brackets () after forest name denotes compartment number.

**TABLE 10a. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gain trials
Nelson Region**

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	HIGH SL Golden Downs (133): GF7(1) GF25(1) LI25(GF13)(1)	LOW SL Ditchlings: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	•	•
150 - 225	•	•	•	
225 - 275		•	•	
275 - 350			•	
350 - 500				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) Brackets () after forest name denotes compartment number.

**TABLE 10b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic gain trials
Nelson Region**

INITIAL STOCKING RANGE 500 - 900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	•	LOW SI Golden Downs (345): GF13(3)	LOW SI Golden Downs (345): GF13(3)	
150 - 225	LOW SI Ditchlings: (GF7(2) GF14(2) GF21(2) LI28GF(13)(2) HIGH SI Golden Downs(133): GF7(2) GF14(1) GF16(1) GF25(2) LI25(GF13)(2)	LOW SI Golden Downs (345): GF13(3)	LOW SI Ditchlings : GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	Golden Downs : GF13(3)
225 - 275	MOD SI Golden Downs (112): GF5(2) GF16(2) GF23(2) LI27(GF6)(2)	•	•	
275 - 350	•			
350 - 500	•	LOW SI Golden Downs (345): GF13(3)	LOW SI Golden Downs (345): GF13(3)	
500-900				LOW SI Ditchlings: GF7(2) GF13(6) GF14(2) GF21(2) LI28(GF13)(2) MOD SI Goldens Downs (112): GF5(2) GF16(2) GF23(2) LI27(GF6)(2)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are nongenetic gain plots.
- 3) Brackets () after forest name denotes compartment number.

**TABLE 10c. Existing plot coverage of the framework for a "Core" PSP " growth database for SGM genetic gain trials
Nelson Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225		•	•	
225 - 275				
275 - 350		MOD SI Golden Downs(26 & 66): GF2(3) GF7(12) GF14(12) GF22 (3) LI19(GF8)(6)	•	
350 - 500	HIGH SI Golden Downs (133): GF7(2) GF25(2) LI25(GF13)(2) LOW SI Ditchlings: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)			
500 - 900	LOW SI Ditchlings GF7(2) GF14(2) GF21(2) LI28(GF13)(2) HIGH SI Golden Downs (133): GF7(1) GF25(1) LI25(GF13)(1)			
900 - 1800				HIGH SI Golden Downs (133): GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) Brackets () after forest name denotes compartment number.

**TABLE 11a. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Canterbury Region**

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
< 150	LOW SI Shellocks: GF7(1) GF25(1) LI25(GF13)(1) MOD SI Dalethorpe: GF14(2) GF22(2) LI23(GF9)(2) HIGH SI Ashley: GF7(1) GF25(1) LI25(GF13)(1)	•	•	
150 - 225	•	•	•	LOW SI Eyrewell (33): GF17c(1) MOD SI Dalethorpe: GF17c(2) LOW SI Eyrewell (33) GF16(2)
225 - 275		•	•	
275 - 350			•	
350 - 500				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 Cuttings
- 4) Brackets () after forest name denotes compartment number.

TABLE 11b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Canterbury Region

INITIAL STOCKING RANGE 500-900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	•	LOW SI Eyrewell (32): GF13(3)	LOW SI Eyrewell (32) GF13(3)	
150 - 225	LOW SI Shellocks: GF7(2) GF14(1) GF16(1) GF25(2) LI25(2) MOD SI Dalethorpe: GF14(2) GF17c(2) GF22(2) LI23(2) HIGH SI Ashley: GF7(2) GF14(1) GF16(1) GF25(2) LI25(2)	LOW SI Eyrewell (32): GF13(3)	LOW SI Eyrewell (32) GF13(3) MOD SI Dalethorpe GF14(2) GF22(2) LI23(2)	
225 - 275	•	•	•	
275 - 350	LOW SI Eyrewell (33): GF16(4)	•	•	
350 - 500	•	LOW SI Eyrewell (32): GF13(3)	LOW SI Eyrewell (32): GF13(3)	
500 - 900				LOW SI Eyrewell(33): GF13(6) GF22(2) MOD SI Dalethorpe: GF14(2) GF22(2) LI23(GF9)(2)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings
- 4) Brackets () after forest name denotes compartment number.

**TABLE 11c. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Canterbury Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225		•		
225 - 275				
275 - 350		MOD SI Waimate: GF2(3) GF7(3) GF14(3) GF22(3)	•	
350 - 500	LOW SI Shellocks: GF7(2) GF25(2) LI25(GF13)(2) Eyrewell (33): GF17(2) GF22(2)	MOD SI Dalethorpe: GF14(2) GF17c(2) GF22(2) LI23(GF9)(2)	HIGH SI Ashley: GF7(2) GF25(2)	•
500 - 900	LOW SI Shellocks: GF7(1) GF25(1) LI25(GF13)(1) Eyrewell (33): GF22(2)	MOD SI Dalethorpe: GF14(2) GF22(2) LI23(GF9)(2)	HIGH SI Ashley: GF7(1) GF25(1) LI25(GF13)(1)	
900 - 1800				LOW SI Shellocks: GF7(1) GF14(1) GF16(1) GF25(1) LI25(1)
				HIGH SI Ashley: GF7(1) GF14(1) GF16(1) GF25(1) LI25(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.
- 3) GF17c = GF17 cuttings
- 4) Brackets () after forest name denotes compartment number.

TABLE 12a. Existing plot coverage of framework for a "Core" PSP growth database for SGM genetic trials Southland Region.

INITIAL STOCKING RANGE < 500				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	LOW SI Blue Mountains: GF7(1) GF25(1) LI25(GF13)(1) HIGH SI Hokonui: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1) HIGH BA Otago Coast: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	•	•	
150 - 225	•	•	•	
225 - 275		•	•	
275 - 350			•	
350 - 500				•

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

**TABLE 12b. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Southland Region**

INITIAL STOCKING RANGE 500 - 900				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150	•	•	•	
150 - 225	LOW SL Blue Mountains: GF7(2) GF14(1) GF16(1) GF25(2) LI25(GF13)(2)	HIGH BA Otago Coast: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	HIGH SL Hokonui: GF7(2) GF14(1) GF16(1) GF25(2) LI25(GF13)(2)	HIGH BA Otago Coast: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)
225 - 275	•	•	•	
275 - 350	•	•	•	
350 - 500	•	•	•	
500 - 900				HIGH BA Otago Coast: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)
				Longwood: GF2(3) GF7(3) GF14(3) GF22(3)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

**TABLE 12c. Existing plot coverage of the framework for a "Core" PSP growth database for SGM genetic trials
Southland Region**

INITIAL STOCKING RANGE 900 - 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHIN
<150				
150 - 225		•		
225 - 275				
275 - 350		MOD SI Dean: GF7(3) GF8(5) GF14(6) LI19(GF8)(5)	HIGH BA Longwood: GF2(3) GF7(3) GF14(3) GF22(3)	•
350 - 500	LOW SI Blue Mountains: GF7(2) GF25(2) LI25(GF13)(2)	HIGH BA Otago Coast: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	HIGH SI Hokonui: GF7(2) GF25(2) LI25(GF13)(2)	
500 - 900	LOW SI Blue Mountains: GF7(2) GF25(2) LI25(GF13)(2)	HIGH BA Otago Coast: GF7(2) GF14(2) GF21(2) LI28(GF13)(2)	HIGH SI Hokonui: GF7(2) GF25(2) LI25(GF13)(2)	
900 - 1800				HIGH SI Hokonui: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1) LOW SI Blue Mountains: GF7(1) GF14(1) GF16(1) GF25(1) LI25(GF13)(1)

- 1) Categories are high, moderate and low site index and high basal area sites. Number of plots in each category are in parenthesis.
- 2) An • denotes a category identified as part of the core framework but in which there are no genetic gain plots.

TABLE 13.

Framework for a "Core" PSP growth database

INITIAL STOCKING RANGE > 1800				
RESIDUAL STOCKING RANGE (stems per ha)	THINNING MCH RANGE (m)			
	< 9	9 - 17	> 17	UNTHINNED
<150				
150 - 225				
225 - 275				
275 - 350		•	•	
350 - 500				
500 - 900				
900 - 1800				
>1800				•

A • denotes a category identified as part of the core framework

TABLE 14. New Breeds Trials - Schedule of late thinnings

PLOT ID	Forest	Owner	Current Age	Current MCH	Current Mean DBH	Timing of Thinning	Initial Stocking	Final Stocking	No. Plots	Estimated Thin Date	Thin Age
RO 1897	KANG	F Corp	10	14.1	14.1	20m	700	400	6	1997	13
							700	300	6	1997	13
FR 7	WOOD	CHHF	7	9	17.4	20m	500	200	8	2002	15
FR 9	KANG	F Corp	8	7.7	16.4	20m	500	200	8	2004	17
FR 11	DTLG	Tasman	7	8.9	16.5	20m	500	200	8	2000	13
FR 12	OTCO	Wenita	7	6.8	14.7	20m	500	200	8	2003	16
FR 54	MMRM	CHHF	7	11.3	25.3	20m	500	200	6	2000	12
FR 56	DALE	Selwyn	7	6.4	15.1	20m	500	200	6	2005	17
FR 57	TIKO	FRI	7	8.9	18.3	20m	500	200	6	2002	14
FR 77	TIKO	FRI	6	7.3	16	20 m	500	200	6	2003	14
FR 78	GWAV	CHHF	6	7.3	15.4	20 m	500	200	6	2003	14
FR 84	KAWA	Olsen	6	11.8	20.7	20m	600	250	12	1999	10
FR 85	KANG	F Corp	6	9.1	15	20m	833	250	14	2001	12

TABLE 15. PROJECTED WORK PROGRAMME 1994 - 2000

pt No.	Forest	Plant Year	No. Plots	Trial Name	Owner	Month Meas.	No. of Man-days from July to June					
							94/95	95/96	96/97	97/98	98/99	99/00
972	ROEU	70	16	EFM Initial Stocking	FCOR	May	12	0	0	9	0	0
1056	WOOD	75	24	GTI 850 Polycross	CHHF	April	0	12	0	0	12	0
2098	KANG	75	24	GTI 850 Polycross	FCOR	June	0	8	0	0	8	0
529/1	GDNW	75	24	GTI 850 Polycross	TASM	May	0	20	0	0	20	0
597	EYWL	75	24	GTI 850 Polycross	CHHF	May	0	10	0	0	10	0
1058	AUPO	78	18	GTI Genetic Gain	JUKN	July	4	4	4	4	4	0
2103/1	KANG	78	24	GTI Genetic Gain	FCOR	June	10	10	10	10	0	10
2103/2	KANG	78	24	GTI Genetic Gain	FCOR	June	10	10	10	10	0	10
N 377	MOHA	78	18	GTI Genetic Gain	CHHF	Aug	10	10	10	10	10	0
530/2	GDNE	78	18	GTI Genetic Gain	TASM	July	10	10	10	10	10	0
421	WMTE	78	12	GTI Genetic Gain	TLDS	May	6	6	6	6	0	6
564/1	LONG	78	12	GTI Genetic Gain	RAYN	June	6	6	6	6	0	6
564/2	LONG	78	12	GTI Genetic Gain	RAYN	June	6	6	6	6	0	6
530/1	GDNW	79	24 #	GTI Genetic Gain	TASM	July *	8	8	8	8	8	8
2103/3	KANG	79	20 #	GTI Genetic Gain	FCOR	June *	6	6	6	6	6	6
682	DEAN	80	24 #	GTI Genetic Gain	RAYN	June	9	9	9	9	9	9
58	RVHD	82	6	G. Will best practice	CHHF	Aband	3	0	0	0	0	0
59	MOER	81	6	GTI 880 Progeny	CHHF	Aband	7	0	0	0	0	0
60	WEIT	82	12	GTI Pair Cross	CHHF	Aband	6	0	0	0	0	0
1897	KANG	84	66	GTI Genetic Gain	FCOR	July * LT	24	24	24	24	24	24
7	WOOD	87	54	Silviculture/Breed	CHHF	June * LT	8	8	8	8	8	8
8	TAHO	87	54	Silviculture/Breed	TASM	May * LT	12	12	12	12	12	12
9	KANG	87	48	Silviculture/Breed	FCOR	May * LT	6	6	6	6	6	6
10	GLNG	87	54	Silviculture/Breed	CHHF	May * LT	8	8	8	8	8	8
11	DTLG	87	48	Silviculture/Breed	TASM	July * LT	10	10	10	10	10	10
12	OTCO	87	48	Silviculture/Breed	WENT	June * LT	12	12	12	12	12	12
54	MMRN	88	44	Silviculture/Breed	CHHF	June * LT	10	10	10	10	10	10
55	EYWL	88	22	Silviculture/Breed	CHHF	May * LT	25	8	8	8	8	8
56	DALE	88	42	Silviculture/Breed	SELW	May * LT	60	10	10	10	10	10
57	TIKO	88	42	Silviculture/Breed	CHHF	May * LT	12	12	12	12	12	12
77	TIKO	89	36	Silviculture/Breed	CHHF	May * LT	73	10	10	10	10	10
78	GWAV	89	36	Silviculture/Breed	CHHF	June * LT	34	6	6	6	6	6
84	Kawe	89	36	Silviculture/Breed	PFOL	April * LT	22	22	22	22	22	22
85	KANG	89	42	Silviculture/Breed	FCOR	April * LT	8	8	8	8	8	8
86	GDNW	89	16	Silviculture/Breed	TASM	May * LT	40	8	8	8	8	8
121/1	TUNG	90	25	Silviculture/Breed	CHHF	est 95/96		28	9	9	9	9
121/2	ATIA	90	32	Silviculture/Breed	CHHF	Aug *	35	12	12	12	12	12
121/3	GWAV	90	22	Silviculture/Breed	CHHF	est 95/96		30	9	9	9	9
121/4	TIRU	90	18	Silviculture/Breed	CHHF	Aug *	25	3	3	3	3	3
121/5	HOKO	90	27	Silviculture/Breed	RAYN	est 95/96		35	9	9	9	9
121/6	P.TA	90	25	Silviculture/Breed	TASM	Sept	30	7	7	7	7	7
121/7	HNUI	90	18	Silviculture/Breed	TASM	July *	30	10	10	10	10	10
121/8	MANT	91	25	Silviculture/Breed	RAYN	est 95/96		28	9	9	9	9
121/9	SANT	91	25	Silviculture/Breed	ERNS	est 96/97			28	9	9	9
121/10	BLUE	91	25	Silviculture/Breed	ERNS	est 96/97			28	9	9	9
121/11	SHEL	91	25	Silviculture/Breed	SELW	est 96/97			28	9	9	9
121/12	ASHY	91	25	Silviculture/Breed	CHHF	est 96/97			28	9	9	9
121/13	GDNE	91	25	Silviculture/Breed	TASM	est 95/96		28	9	9	9	9

5 plots abandoned
in kind help requested '95
- late thinning required

TOTAL DAYS	597	490	448	381	384	348
MAN WEEKS	119.4	98	89.6	76.2	76.8	69.6

APPENDIX 1

Experimental design for completely randomised Initial Crop Stocking Trial planted in 1970 at Rotoehu (RO972).
Each dot represents one large plot with a PSP.1)

Trt	Pruning	Silviculture					Planting stock			
		Stocking (stems/ha)			Thinning		Seedlings		Cuttings ²⁾	
		Initial	1st interim	2nd interim	Final	1st MCH (m)	2nd MCH (m)	3rd MCH (m)	Ratio	
1	2.2m, 4.2m, 6m	250	250	250	250	-	-	-	1:1	••
2	"	500	500	500	250	-	-	12	2:1	••
3	"	750	750	500	250	-	8.2	12	3:1	••
4	"	1000	750	500	250	6.2	8.2	12	4:1	••
5	"	1250	750	500	250	6.2	8.2	12	5:1	••
6	"	1500	750	500	250	6.2	8.2	12	6:1	••

- 1) Sixteen PSP's established 1975. Data available: Height and diameter annually 1975-1983, then biannually from 1985-1995, 3 yearly thereafter.
- 2) Cuttings from older trees (probably about 8-9 years old) of uncertain breed, probably unselected.

APPENDIX 2

Experimental design for randomised complete block Final Crop Stocking Trial planted in 1975 (as GTI "850 Polycross" trial) at Woodhill (AK1056), Kaingaroa Cpt 327 (RO2098), Golden Downs (NN529) and Eyrewell (CY597).
Each dot represents one large plot with a PSP.¹⁾

Trt	Pruning	Silviculture				Planting stock	
		Stocking (stems/ha)		Thinning		Seedlings	
		Initial	Final	MCH (m)	Ratio	GF13 (approx.) ²⁾	
1	2.2 m, 4.2 m ³⁾	625	100	12	6.25:1	•••	•••
2	"	625	200	12	3.1:1	•••	•••
3	"	625	400	12	1.6:1	•••	•••
4	"	625	625	-	1:1	••••••	••••••
5	"	625	100	20	6.25:1	•••	•••
6	"	625	200	20	3.1:1	•••	•••
7	"	625	400	20	1.6:1	•••	•••

- 1) Twenty four PSP's established at each site in 1986. Data available: Height and diameter annually 1986-1994, biannually thereafter.
- 2) Single-tree-plot progeny trial consisting of offspring from 100 mothers (most are "850" series selections from both the North and South Islands) crossed with a pollen mix of 10 North Island "850" series parents. Seedlot C72/654 at Woodhill, Nelson and Canterbury. Seedlot R72/927 at Kaingaroa.
- 3) 200 stems/ha treatments pruned to 6 m at Kaingaroa (RO2098) and Golden Downs (NN529).

APPENDIX 3

Experimental design for randomised complete block 1978 Genetic Gain Trial (sawlog regime) planted in 1978 at Aupouri (AK1058), Kaingaroa Cpt 1210 (RO2103/1), Mohaka (WN377), Golden Downs (NN530/2), Longwood (SD564/1) and Waimate (CY421/1). Each dot represents one large plot with a PSP.¹⁾²⁾

Silviculture				Site		Planting stock					
Trt	Pruning	Stocking (stem/ha)			Thinning			Seedlings 3)			
		Initial	Interim	Final	1st MCH (m)	2nd MCH (m)	Ratio	GF2 (R74/1027)	GF7 4)	GF14 (WN76/2/3)	GF22 (850-55x850-96)
1	2.2m, 4.2m, 6m	1111	600	300	6.2	12	3.7:1	••• 2)	••••••	••••••	••• 2)
								••• 2)	••••••	••••••	••• 2)
								••• 2)	••••••	••••••	••• 2)
								••• 2)	••••••	••••••	••• 2)
								••• 2)	••• 2)	••• 2)	••• 2)
								••• 2)	••• 2)	••• 2)	••• 2)

1) Twelve PSP's established 1986 at Aupouri, Kaingaroa, Mohaka and Golden Downs. Twelve PSP's established 1991 at Longwood and Waimate.

Data available:

AK1058, RO2103/1, NN530/2: Height and diameter annually 1986 to 1998, biannually thereafter.

WN377: Height and diameter annually 1986-1988, annually 1991 to 1998, biannually thereafter.

SD564/1, CY421: Height and diameter annually 1992 to 1998, biannually thereafter.

2) Six additional PSP's were established in 1991/92 at Aupouri, Mohaka and Golden Downs, and twelve additional at Kaingaroa (Appendix 3a). Some plots had their centres moved in 1994 due to an establishment error (3 plots GDNS, 5 plots LONG, 2 plots MOHA and 1 plot WMTE).

3) Three additional seedlots (6 reps) are included on all sites in this experiment but are not being monitored with PSP's. They are: GF10 (GF13 in Southland), CY/C/75/52, GF8 (GF14 in Canterbury), CY/C/75/51, GF16, FRI 76/2052

4) Local climbing select seedlots have been arbitrarily assigned a GF7. They are:

Kaingaroa climbing select R/76/01 at Aupouri (AK1058) and Kaingaroa (RO2103/1)

Ngaumu climbing select WN/C/75/15 at Mohaka (WN377)

Golden Downs climbing select NN/C/75/2 at Golden Downs (NN530/2)

Balmoral climbing select CY/C/75/40 at Waimate (CY421)

Rankleburn climbing select SD/C/75/27 at Longwood (SD564/1)

APPENDIX 3A

Plots established in the 1978 Genetic Gain Trials by year.

Trial	No. of PSP's Added				Year	No. plots
	GF2	GF7	GF14	GF22		
AK 1058	-	6	6	-	1986	12
	3	-	-	3	1992	6
	3	6	6	3		18
RO 2103/1	-	6	6	-	1986	12
	3	-	-	3	1991	6
	3	-	-	3	1993	6
TOTAL	6	6	6	6		24
RO 2103/2	-	6	6	-	1986	12
	6	-	-	6	1991	12
	6	6	6	6		24
TOTAL	6	6	6	6		24
WN 377	-	6	6	-	1986	12
	-	-	-	2	1991	2
	3	-	-	1	1992	4
	3	6	6	3		18
TOTAL	3	6	6	3		18
NN 530/2	-	6	6	-	1986	12
	3	-	-	3	1991	6
	3	6	6	3		18
TOTAL	3	6	6	3		18
CY 421	3	3	3	3	1991	12
	3	3	3	3		12
	3	3	3	3		12
TOTAL	3	3	3	3		12
SD 564/1	3	3	3	3	1991	12
	3	3	3	3		12
	3	3	3	3		12
TOTAL	3	3	3	3		12
SD 564/2	3	3	3	2	1991	11
	3	3	3	2		11
	3	3	3	2		11
TOTAL	3	3	3	2		11

APPENDIX 4

Experimental design for randomised complete block 1978 Genetic Gain Trial (pulpwood regime) planted in 1978 at Kaingaroa Cpt 1210 (RO2103/2) and Longwood (SD564/2).
Each dot represents one large plot with a PSP. 1)2)

Silviculture				Site	Planting stock			
Trt	Pruning	Stocking (stems/ha)		Thinning	Seedlings 3)			
		Initial	Final	Ratio	GF2 (R74/1027)	GF7 4)	GF14 (WN76/2/3)	GF22 (850-55 x 850-96)
1	2.2 m	711	711	1:1	Kaingaroa (RO2103/2)	 2)		 2)
					Longwood (SD564/2)	... 2)	...2)	... 2)

- 1) Twelve PSP's established 1986 at Kaingaroa. **Data available:** Height and diameter annually 1986-1998, biannually thereafter. Twelve PSP's established 1991 at Longwood. **Data available:** Height and diameter annually 1992-1998, biannually thereafter.
- 2) There were additional PSP's established in 1991/92. Some plots had their centres moved in 1994 due to an establishment error (5 plots Kaingaroa).
- 3) Three additional seedlots (6 reps) are included on all sites in this experiment but are not being monitored with PSP's. They are: GF10 (GF13 in Southland) - CY/C/75/52, GF8 (GF14 in Canterbury) - CY/C/75/51, GF16 - FRI 76/2052
- 4) Local climbing select seedlots have been arbitrarily assigned a GF7. They are:
Kaingaroa climbing select R76/01 at Aupouri (AK1058) and Kaingaroa (RO2103/1)
Rangleburn climbing select SD/C/75/27 at Longwood (SD564/2)

APPENDIX 5

Experimental design for randomised complete block 1979 Genetic Gain Trial planted in 1979 at Kaingaroa Cpt 1218 (RO2103/3) and Golden Downs (NN530/1) and in 1980 at Dean (SD682).
Each dot represents one large plot with a PSP. 1)

		Silviculture				Site		Planting stock					
Trt	Pruning	Stocking (stem/ha)			Thinning			Seedlings					
		Initial	Interim	Final	1st MCH (m)	2nd MCH (m)		Ratio	GF7 2)	GF8 (CY/C/75/51)	GF14 (FRI78/2299)	GF14 3) (FRI78/2300)	LI19 (GF8 (FRI78/2301)
1	2.2m, 4.2m, 6m	1111	600	300	6	12	3.7:1	Kaingaroa	4)	5)	6)	4)	4)
								Golden Downs		5)	6)		
								Dean	...		6)		

- 1) Twenty four PSP's established at Golden Downs and Dean, and twenty PSP's established at Kaingaroa in 1986. Data available: Height and diameter annually from 1986.
- 2) Local climbing select seedlots have been arbitrarily assigned a GF7. They are:
Kaingaroa climbing select R76/01 at Kaingaroa (RO2103/3) and Golden Downs (NN530/1)
Rankleburn Cpt 17 climbing select (SD/C/76/2) at Dean (SD682) (plots were established in the forest surrounding the trial).
- 3) Seedlot FRI78/2300 was reclassified from GF18 to GF14 (see Stand Growth Modelling Report No 35)
- 4) Three plots at Kaingaroa were abandoned in 1994 due to dothistroma mortality and poor form (group of plots planted in a hole).
- 5) Up to 6 replications of seedlot CY/C/75/51 are not being monitored at Kaingaroa (RO2103/3) and Golden Downs (NN530/1).
- 6) Seedlot FRI78/2299 (GF14) was found to be inbred and plots were abandoned in 1992 (last measured 1991).

APPENDIX 6

Silviculture and seedlot for Silviculture Comparison established in the Best Practices trial planted in 1982 at Riverhead (FR58).
Each dot represents one large plot with a PSP.1)

Trt	Pruning	Silviculture				Planting Stock	
		Stocking (stems/ha)		Thinning		Seedlings	
		Initial	Interim	Final	1st MCH (m)	2nd MCH (m)	Ratio
1	250 stems to 3 m, 4.5 m, 6 m	1600	500	250	(age 6)	(age 7-8)	6.4:1
2	250 stems to 4.5 m	1600	1000	250	3	(age 6)	6.4:1

- 1) Six PSP's established 1988. Data available: Height and diameter 1988, 1989 and 1992-95. Access very poor due to weed competition. Trial taken out of the New/Breeds re measurement programme in 1995. No genetic comparison, therefore, unsuitable for genetic gain analysis.

APPENDIX 7

Silviculture and seedlot for Silviculture/Site Comparison established in "880" series progeny trial planted in 1981 at Moerewa (FR59).
Each dot represents one large plot with a PSP. 1)

Trt	Pruning	Silviculture			Planting stock	
		Stocking (stems/ha)		Thinning	Seedlings	
		Initial	Final	MCH (m)	Ratio	GF16 (approx.) 2)
1	2.2 m, 4.2 m, 6 m	816	350	(age 8)	5.1:1	●●●3)
2	2.2m	816	816	-	1:1	●●●4)

- 1) Six PSP's established 1988. Data available: Height and diameter annually 1988-92 and 1994. Trial taken out of the New/Breeds re measurement programme in 1995. No genetic comparison, therefore, unsuitable for genetic gain analysis.
- 2) Single-tree-plot progeny trial consisting primarily of approximately 170 open-pollinated offspring from "880" series ortets. Ortets are in the "268" series progeny trial planted at Kaingaroa Cpt 1350. See GTI Work Plan 185 for details.
- 3) Medium Site Index site.
- 4) Low Site Index site.

APPENDIX 8

Silviculture and seedlot for Final Crop Stocking Comparison established in the 268 x 875 Paircross progeny trial planted in 1982 at Weiti Station (FR60).
Each dot represents one large plot with a PSP.¹⁾

Trt	Pruning	Silviculture			Planting stock	
		Stocking (stems/ha)		Thinning		Seedlings
		Initial	Final	MCH	Ratio	
1	2.2 m, 4.2 m, 6 m	625	100	(age 6)	6.3:1	•••
2	"	625	200	(age 6)	3.1:1	•••
3	"	625	300	(age 6)	2.1:1	•••
4	"	625	400	(age 6)	1.6:1	•••

- 1) Twelve PSP's established 1988. Data available: Height and diameter annually 1988-1994. Trial taken out of the New/Breeds re measurement programme in 1995. No genetic comparison, therefore, unsuitable for genetic gain analysis.
- 2) Single-tree plot progeny trial consisting primarily of 128 crosses of "268" series x "875" series parents. See GTI Work Plan 22 for details.

APPENDIX 9

Experimental design for randomised complete block 1984 Genetic Gain Trial planted in 1984 at Kaingaroa Cpt 327 (RO1897).
Each dot represents one large plot with a PSP.¹⁾

Silviculture				Planting stock 3)										Cuttings 5)
Trt	Pruning	Stocking (stems/ha)	Thinning 4)	Seedlings										
		Initial	Final	MCH (m)	Ratio	GF7 (FRI79/2320) F	GF14 (3/3/83/2) E	GF16 (9/0/83/91) C	GF17 (9/0/83/96) D	LI25 (GF11) (approx.) (9/0/83/99) I	LI20(GF10) (approx.) (9/0/83/95) B	GF16 (approx.) Hc		
1	2.2m	700	300	11.7	2.3:1	•••	•••2)	•••	•••	•••	•••	•••2)		
2	"	700	400	11.7	1.8:1	•••	•••2)	•••	•••	•••	•••	•••		
3	"	700	300	20	2.3:1	••	••2)	••	••2)	••	••	••		
4	"	700	400	20	1.8:1	••	••2)	••	••	••	••	••		

- 1) Fifty four PSP's established 1990. **Data available:** Height and diameter annually from 1990.
- 2) Twelve additional PSP's were established in 1991: ten in GF14, one in GF17, and one in the GF16 cuttings. **Data available:** height and diameter annually from 1991.
- 3) Four additional types of planting stock are included in this experiment but are not being monitored with PSP's. They are:
LI27(GF7) 9/0/83/98 - seedlings (10 reps)
GF7 Cuttings from Kaingaroa climbing select 1 year old seedlings, FRI79/2320, in FRI nursery (2 reps)
GF16 (approx.) Cuttings from 1 year old seedlings planted for progeny testing from open-pollinated mother tree collections made in Kaingaroa seed orchard ("880" parents) (2 reps)
GF16 Cuttings from 4 yr old trees in "875" diallel progeny tests at Kaingaroa Cpt 327 and Onepu (10 reps)
- 4) First thinning treatment (11.7m MCH) carried out in March 1993.
Second thinning treatment (20m MCH) expected to be carried out in summer 1997.
- 5) Cuttings were from 3-year-old plants collected in GTI's 268 x 875 ESSO trial at Kaingaroa Cpt 1132

APPENDIX 10

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1987 at Woodhill (FR7).
Each dot represents one large plot with a PSP 1).

Silviculture					Planting stock					
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings				
		Initial	Final	MCH (m)	Ratio	GF7 (79/2320)	GF14 (3/3/85/1)	GF19 (2/6/86/29) or (2/3/87/27)	GF21 (6/3/86/46)	LI28(GF13) (9/3/86/166)
1	4m	500	100	6.2	5:1	••	••		••	••
2	"	500	200	6.2	2.5:1	••	••		••	••
3	"	1000	400	6.2	2.5:1	••	••		••	••
4	"	1500	600	6.2	2.5:1	••	••		••	••
5	Unpruned	500	500	-	1:1	••	••		••	••
6	4m	500	200	20	2.5:1	••	••		••	••
<u>Additional at Woodhill (FR7):</u>										
7	Best 250 s/ha	800	250	6.2	3.2:1			•		
8	Best 320 s/ha	800	320	6.2	2.5:1			•		
9	Best 250 s/ha	1000	250	6.2	4:1			•		
10	Best 320 s/ha	1000	320	6.2	3.1:1			•		
11	Best 250 s/ha	1200	250	6.2	4.8:1			•		
12	Best 320 s/ha	1200	320	6.2	3.75:1			•		

- 1) Fifty four PSP's established December 1992. Data available: Heights only, age 2, pruning measurements 1992, height and diameter annually from 1993.
PSP establishment and silviculture is documented in Stand Growth Modelling Cooperative Report 32.

APPENDIX 11

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1987 at Tahorakuri (FR8).
Each dot represents one large plot with a PSP 1).

Silviculture							Planting stock						
Trt	Pruning		Stocking (stems/ha)			Thinning		Seedlings					
	1st Gauge prune	2nd 2) Crown remaining	Initial	Interim	Final	1st MCH (m)	2nd MCH (m)	Ratio	GF7 (79/2320)	GF14 (3/3/85/1)	GF21 (Best 16 "268" series - NZFP)	GF21 (6/3/86/46)	LI28(GF13) (9/3/86/166)
1	10cm	4m	500	-	100	6.2		5:1	••	••		••	••
2	"	"	500	-	200	6.2		2.5:1	••	••		••	••
3	"	"	1000	-	400	6.2		2.5:1	••	•		••	••
3a	"	"	1000	500 ⁵⁾	400	4.5	6.2	2.5:1		•		••	••
4	"	"	1500	-	600	6.2		2.5:1	•	••		••	••
4a	"	"	1500	400 ⁵⁾	400	4.5		3.75:1	•			••	••
5	Unpruned	Unpruned	500	-	500	-		1:1	••	•		••	••
5a	"	4m	500	-	500					•			
6	10cm	4m	500	-	200	6.2 ³⁾		2.5:1	••	••		••	••
Additional at Tahorakuri (FR8):													
7	None		1000	-	1000	-		1:1			•••		
8	2.2m, 4.2m, 6m ⁴⁾		1000	-	375	20		2.7:1			••		
8a	400 stems to 2.2m		1000	-	400	6.2		2.5:1			•		

- 1) Fifty four PSP's established March 1992. Data available: Heights only, age 1, pruning data 1992, height and diameter annually from 1992. PSP establishment and silviculture is documented in Stand Growth Modelling Cooperative Report 32.
- 2) An unscheduled 2nd prune was carried out by local staff at 9.0m MCH in October 1993.
- 3) Treatment 6 was originally a production thin (at 20-25m MCH) but was thinned in error at plot establishment, now equivalent to treatment 2.
- 4) First pruning to 2.2m at 9.0m MCH in October 1993.
- 5) An unscheduled interim thinning was carried out by local staff during the regeneration cutting operation in 1991.

APPENDIX 12

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1987 at Kaingaroa Cpt 481 (FR9).
Each dot represents one large plot with a PSP 1).

Trt	Pruning	Silviculture			Planting stock						
		Stocking (stems/ha)		Ratio	Seedlings						
		Initial	Final		MCH (m)	GF7 (79/2320)	GF14 (3/3/85/1)	GF21 (6/3/86/46)	LI28(GF13) (9/3/86/166)		
	Crown remaining				D	C	A	B			
1	4m	250	100	2.5:1	6.2	6.2	6.2	6.2	6.2		
2	"	500	200	2.5:1	6.2	6.2	6.2	6.2	6.2		
3	"	1000	400	2.5:1	6.2	6.2	6.2	6.2	6.2		
4	"	1500	600	2.5:1	6.2	6.2	6.2	6.2	6.2		
5	Unpruned	500	500	1:1	-	-	-	-	-		
6	4m	500	200	2.5:1	20	20	20	20	20		

- Forty eight PSP's established March 1994. **Data available:** Heights only, age 2, pruning measurements 1994, height and diameter annually from 1994.
PSP establishment and silviculture is documented in Stand Growth Modelling Cooperative Report 32.

APPENDIX 13

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1987 at Glengarry (FR10).
Each dot represents one large plot with a PSP 1).

Trt	Pruning	Silviculture				Planting stock						
		Stocking (stems/ha)			Thinning		Seedlings					
		Initial	Interim	Final	1st MCH (m)	2nd MCH (m)	Ratio	GF7 (79/2320)	GF14 (3/3/85/1)	GF16 (2/6/86/27)	GF21 (6/3/86/46)	LI28(GF13) (9/3/86/166)
1	10 cm	500	-	100	6.2	-	5:1	••	••		••	••
2	"	500	-	200	6.2	-	2.5:1	••	••		••	••
3	"	1000	-	400	6.2	-	2.5:1	••	••		••	••
4	"	1500	-	600	6.2	-	2.5:1	••	••		••	••
5	Unpruned	500	-	500	-	-	1:1	••	••		••	••
6	10 cm	500	-	200	6.22)	-	2.5:1	••	••		••	••
<u>Additional at Glengarry (FR10):</u>												
7	2.2m, 4.2m	500	-	200	20	-	2.5:1			•••		
8	2.2m, 4.2m, 6m	1000	300	200	18	28	5:1			•••		

- 1) Fifty four PSP's established February 1992. **Data available:** Heights only, age 2, pruning measurements 1992, height and diameter annually from 1992.
PSP establishment and silviculture is documented in Stand Growth Modelling Cooperative Report 32.
- 2) Treatment 6 was originally a production thin (at 20m MCH) but was thinned in error at plot establishment, now equivalent to treatment 2.

APPENDIX 14

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1987 at Ditchlings (FR11).
Each dot represents one large plot with a PSP 1/2).

Trt	Silviculture				Planting stock					
	Pruning	Stocking (stems/ha)		Thinning		Seedlings				
		Initial	Final	MCH (m)	Ratio	GF7 (79/2320)	GF14 (3/3/85/1)	GF21 (6/3/86/46)	LI28(GF13) (9/3/86/166)	
	Crown remaining					D	C	A	B	
1	4m	500	100	6.2	5:1	••	•• 3)	••	••	••
2	"	500	200	6.2	2.5:1	••	••	••	••	••
3	"	1000	400	6.2	2.5:1	••	••	••	••	••
4	"	1500	600	6.2	2.5:1	••	••	•• 4)	••	••
5	Unpruned	500	500	-	1:1	••	••	••	••	••
6	4m	500	200	20	2.5:1	••	••	••	••	••

- 1) Forty eight PSP's established January 1993. Data available: Heights only, age 2, pruning measurements 1993, height and diameter annually from 1993.
PSP establishment and silviculture is documented in Stand Growth Modelling Cooperative Report 32.
- 2) Row plots of each stock type were established adjacent to the large block trial.
- 3) Plot abandoned in 1994 because of a spacing and mortality problem.
- 4) Plot abandoned in 1994 because trees close to power lines were required to be felled.

APPENDIX 15

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1987 at Otago Coast (FR12).
Each dot represents one large plot with a PSP 1).

Trt	Silviculture			Planting stock					
	Pruning	Stocking (stems/ha)		Thinning		Seedlings			
		Initial	Final	MCH (m)	Ratio	GF7 (79/2320)	GF14 (3/3/85/1)	GF21 (6/3/86/46)	LI28(GF13) (9/3/86/166)
1	4m	500	100	6.2	5:1	••	••	••	•2)
2	"	500	200	6.2	2.5:1	••	••	••	••
3	"	1000	400	6.2	2.5:1	••	••	••	••
4	"	1500	600	6.2	2.5:1	••	••	••	••
5	Unpruned	500	500	-	1:1	••	••	••	••
6	4m	500	200	20	2.5:1	••	••	••	••

- 1) Forty seven PSP's established March 1994. Data available: Heights only age 2 years, pruning measurements 1994, height and diameter annually from 1994.
PSP establishment and silviculture is documented in Stand Growth Modelling Cooperative Report 32.
- 2) Plot not established, unable to distinguish plot trees.

APPENDIX 16

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1988 at Mamaranui (FR54).
Each dot represents one large plot with a PSP.¹⁾

Trt	Silviculture				Planting stock				
	Pruning	Stocking (stems/ha)		Thinning		Seedlings			Cuttings
		Initial	Final	MCH (m)	Ratio	GF14 (3/3/87/1) C	GF22 6/6/87/21) A	LI23 (GF9) (9/3/86/70) B	GF17 (9/0/83/96) D
1	4m	250	100	6.2	2.5:1	••	••	••	
2	"	500	200	6.2	2.5:1	••	••	••	••
3	"	1000	400	6.2	2.5:1	••	••	••	••
4	"	1500 2)	600	6.2	2.5:1	••	••	••	
5	Unpruned	500	500	-	1:1	••	••	••	
6	4m	500	200	20	2.5:1	••	••	••	
7	"	200	200	-	1:1				••

- 1) Forty four PSP's established October 1992. Data available: Heights only, age 2, pruning measurements 1992, height and diameter annually from 1992.
- 2) Initial planting 1555 stems/ha. An extra row of trees was included in the buffer (ie. a three row buffer).

Experimental design for randomised complete block Silviculture/Breed Trials planted in 1988 at Eyrewell (FR55).
Each dot represents one large plot with a PSP.¹⁾

- 1) Twenty two PSP's established December 1994. **Data available:** Heights only, age 2, pruning measurements 1994, height and diameter annually from 1995.
- 2) This treatment was incorrectly documented in Report 24a as being pruned and thinned from 1500 to 500 stems/ha.
- 3) Original treatment numbers were reallocated, in December 1994, to a more logical sequence for establishing and numbering of PSP plots.

APPENDIX 18

Experimental design for randomised incomplete block Silviculture/Breed Trials planted in 1988 at Dalethorpe (FR56).
Each dot represents one large plot with a PSP.¹⁾

Silviculture					Planting stock				
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings			Cuttings
		Initial	Final	MCH (m)	Ratio	GF14 (3/3/87/1) C	GF22 6/6/87/21) A	LI23 (GF9) (9/3/86/70) B	
1	4m	250	100	6.2	2.5:1	••	•3)	••	GF17 (9/0/83/96) D
2	"	500	200	6.2	2.5:1	••	•3)	••	
3	"	1000	400	6.2	2.5:1	••	••	•3)	
4	"	1500 2)	600	6.2	2.5:1	••	••	•3)	
5	Unpruned	500	500	-	1:1	••	••	••	
6	4m	500	200	20	2.5:1	••	••	••	
7	"	200	200	-	1:1			••	

- 1) Thirty nine PSP's established March 1995. Data available: Heights only, age 2, pruning measurements 1992, height and diameter annually from 1995.
- 2) Initial planting 1555 stems/ha. The extra row of trees was included in the buffer (ie. a three row buffer).
- 3) Plots not established or abandoned due to poor tree quality and mortality (6 plots in total).

APPENDIX 19

Experimental design for split plot Silviculture/Breed Trial planted in 1988 at Tikokino (FR57).
Each dot represents one large plot with a PSP. 1)

Trt	Silviculture				Planting stock			
	Pruning	Stocking (stems/ha)		Thinning		Seedlings		Cuttings
		Crown remaining	Initial	Final	MCH (m)	Ratio	GF19 (2/6/87/35) A	
1	4m	250	100	6.2	2.5:1	••	••	••
2	"	500	200	6.2	2.5:1	••	••	••
3	"	1000	400	6.2	2.5:1	••	••	••
4	"	1500	500	6.2	2.5:1	••	••	••
5	"	500	200	20	2.5:1	••	••	••
6	Unpruned	600	600	-	1:1	••	••	•2)
7	"	400	400	-	1:1	••	••	•2)

- 1) Forty PSP's established December 1993. Data available: Heights only age 2 years, pruning measurements 1993, height and diameter annually from 1994.
- 2) Plots not established due to high mortality.

APPENDIX 20

Experimental design for split-plot Silviculture/Breed Trial planted in 1989 at Tikokino (FR77).
Each dot represents one large plot with a PSP.¹⁾

Silviculture				Planting stock 2)							
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings			Cuttings		
		Initial	Final	MCH (m)	Ratio	Nursery bed		Root-trainer ³⁾	Nursery bed	Root-trainer ³⁾	Directly planted field cuttings
	Crown remaining					GF5 (88/101) US	GF16 (88/6) OS	GF25 (88/1) RS	GF23 (88/2) OC	GF25 (88/1) RC	DFC
1	Unpruned	500	500	-	1:1	•	•	•	•	•	•
2	4m	500	200	6.2	2.5:1	••	• ⁴⁾	••	••	••	••
3	"	500	200	20	2.5:1	•	•	•	•	•	•
4	"	500	400	6.2	1.25:1	••	••	••	••	••	••

- 1) Thirty five PSP's established November 1994. **Data available:** Heights only, age 2, pruning measurements 1994, height and diameter annually from 1995.
- 2) Row plots of each stock type were established adjacent to large block trials.
- 3) Summer planting of these seedlots (21/4/89).
- 4) Plot not established, unable to locate plot trees.

APPENDIX 21

Experimental design for split plot Silviculture/Breed Trial planted in 1989 at Gwavas (FR78).
Each dot represents one large plot with a PSP.¹⁾

Silviculture				Planting stock 2)					
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings		Cuttings	
	Crown remaining	Initial	Final	MCH (m)	Ratio	Nursery bed		Nursery bed	Directly planted field cuttings
						GF5 (88/101) US	GF16 (88/6) OS		
1	Unpruned	500	500	-	1:1	•	•	•	
2	4m	500	200	6.2	2.5:1	••	••	••	
3	"	500	200	20	2.5:1	•	•	•	
4	"	500	400	6.2	1.25:1	••	••	••	
						GF25 (88/1) RS	GF23 (88/2) OC	GF25 (88/1) RC 4)	DFC 4)

- 1) Twenty four PSP's established January 1995. Data available: Heights only, age 2, pruning measurements 1995, height and diameter annually from 1995.
- 2) Row plots of each stock type were established adjacent to large block trials.
- 3) Summer planting of these seedlots (21/4/89) not very successful.
- 4) No plots established in these seedlots due to high mortality.

APPENDIX 22

Experimental design for completely randomised¹⁾ Silviculture/Breed Trial planted in 1989 at Kawerau (FR84).
Each dot represents one large plot with a PSP 2/3)

Silviculture					Planting stock 4)				
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings			Cuttings
	Crown remaining	Initial	Final	MCH (m)	Ratio	GF5 (88/101) D	GF16 (88/6/2) C	GF25 (88/1) A	GF25 (6/6/87/25) B
1	4m	600	250	6.2	2.4:1	•••	•••	•••	•••
2	4m	600	250	20	2.4:1	•••	•••	•••	•••
3	Unpruned	600	600	-	1:1	•	•	•	•
4	4m	600	600	-	1:1	••	••	••	••

- 1) This experiment has the potential to be carried out in a split-block design with 2 replications.
- 2) Thirty six PSP's established November 1993. **Data available:** Heights only, age 2, pruning measurements 1993, height and diameter annually from 1994. Buffers are 2.75m surrounding each plot, that is, 5.5m between plots.
- 3) Row plots of each stock type were established adjacent to the large block trial.
- 4) GF5 (88/101) was from Bulls nursery; all other planting stock were from Owkata nursery.

APPENDIX 23

Experimental design for split plot **Silviculture/Breed** Trial planted in 1989 at Kaingaroa, Cpt 1187 (FR85).
Each dot represents one large plot with a PSP.1)

Silviculture			Planting stock ²⁾									
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings					Cuttings	
	Crown remaining	Initial	Final	MCH (m)	Ratio	GF5 (88/101) G	GF16 (88/6/2) D	GF18 (88/7/2) C	GF23 (88/2) B	GF25 (88/4) A	GF22 (6/6/87/21) F	GF25 (6/6/87/20) E
1	4m	833	250	6.2	3.3:1	••	••	••	••	••	••	••
2	4m	833	250	20	3.3:1	••	••	••	••	••	••	••
3	Unpruned	667	600	-	1:1	••	••	••	••	••	••	••

- 1) Forty two PSP's established January 1994. **Data available:** Heights only, age 2, pruning measurements 1994, height and diameter annually from 1994.
- 2) GF5 (88/101) was from Bulls nursery; all other planting stock were from Owata nursery.

APPENDIX 24

Experimental design for split-plot **Silviculture/Breed Trial** planted in 1989 at **Golden Downs (FR86)**.
Each dot represents one large plot with a PSP. 1)

Silviculture			Planting stock ²⁾						
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings			
		Initial	Final	MCH (m)	Ratio	GF5 (88/101)	GF16 (88/6)	GF23 (88/2)	LI27(GF6) (88/868)
	Crown remaining								
1	4m	667	250	6.2	2.5:1	••	••	••	••
2	Unpruned	667	600	-	1:1	•	•	•	•
3	4m	667	600	-	1:1	•	•	•	•

- 1) Sixteen PSP's established February 1995. **Data available:** Heights only, age 2, pruning measurements 1995, height and diameter annually from 1995.
- 2) GF5 (88/101) was from Bulls nursery, LI27(GF6) was from FRI nursery (Rotorua); all other planting stock was from Golden Downs nursery.

APPENDIX 25

Experimental design for unbalanced split-split block Silviculture/Breed Trials planted in
1990 at **Tungrove North (FR121/1)** and **Tarawera (FR121/6)**.
Each dot represents one large plot with a PSP.1)

Silviculture					Planting stock					
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings				
		Initial	Final	MCH (m)	Ratio	GF7 (FRI79/2320) D	GF14 (88/105) C	GF16 (88/201) B	GF25 (89/708) A	LI25 (GF13) (89/15) E
1	4m	250	100	6.2	2.5:1	•			•	•
2	"	500	200	6.2	2.5:1	•	•	•	•	•
3	"	1000	400	6.2	2.5:1	•			•	•
4	Unpruned	500	200	6.2	2.5:1	•			•	•
5	4m	1000	400	6.2	2.5:1	•			•	•
6	"	1000	600	6.2	1.7:1	•			•	•
7	"	1000	1000	-	1:1	•	•	•	•	•

- 1) Tungrove North (FR121/1): Twenty five PSP's to be established 1995/96. Data available: Heights only, age 2.
Tarawera (FR121/6): Twenty five PSP's established March 1995. Data available: Heights only, age 2, pruning measurements 1995, height and diameter annually from 1995.

APPENDIX 26

Experimental design for unbalanced split-split block Silviculture/Breed Trial planted in 1990 at Atiamuri (FR121/2).
Each dot represents one large plot with a PSP.1)

Silviculture					Planting stock						
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings					
		Crown remaining	Initial	Final	MCH (m)	Ratio	GF7 (FRI79/2320) D	GF14 (88/105) C	GF16 (88/201) B	GF25 (89/708) A	LI25 (GF13) (89/15) E
1	4m		250	100	6.2	2.5:1	•	•	•	•	•
2	"		500	200	6.2	2.5:1	•	•	•	•	•
3	"		1000	400	6.2	2.5:1	•			•	•
4	Unpruned		500	200	6.2	2.5:1	•			•	•
5	"		1000	400	6.2	2.5:1	•			•	•
6	"		1000	600	6.2	1.7:1	•			•	•
7	"		1000	1000	-	1:1	•	•	•	•	•
8	"		722	300	6.2	2.4:1	•	•	•	•	•

- 1) Thirty two PSP's established February 1995. Data available: Heights only, age 2, pruning measurements 1995, height and diameter annually from 1995.

APPENDIX 27

Experimental design for unbalanced split-split block Silviculture/Breed Trial planted in 1990 at Gwavas (FR121/3).
Each dot represents one large plot with a PSP.1)

Silviculture					Planting stock					
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings				
		Initial	Final	MCH (m)	Ratio	GF7 (FRI79/2320) D	GF14 (88/105) C	GF16 (88/201) B	GF25 (89/708) A	LI25 (GF13) (89/15) E
1	4m	250	100	6.2	2.5:1	•			•	•
2	"	500	1200	6.2	2.5:1	•	•	•	•	•
3	"	1000	400	6.2	2.5:1	•			•	•
4	Unpruned	500	200	6.2	2.5:1	•			•	•
5	"	1000	600	6.2	1.7:1	•			•	•
6	"	1000	1000	-	1:1	•	•	•	•	•

1) Twenty two PSP's scheduled to be established 1995/1996. Data available: Heights only, age 2

APPENDIX 28

Experimental design for unbalanced split-split block Silviculture/Breed Trials planted in 1990 at Tairua (FR121/4) and Huanui (FR121/7).
Each dot represents one large plot with a PSP.1)

Silviculture					Planting stock				
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings			
		Initial	Final	MCH (m)	Ratio	GF7 (FR179/2320) D	GF14 (88/105) C	GF16 (88/201) B	GF25 (89/708) A
1	4m	250	100	6.2	2.5:1	•			•
2	"	500	200	6.2	2.5:1	•	•	•	•
3	"	1000	400	6.2	2.5:1	•			•
4	Unpruned	500	200	6.2	2.5:1	•			•
5	"	1000	400	6.2	2.5:1	•			•
6	"	1000	600	6.2	1.7:1	•			•
7	"	1000	1000	-	1:1	•	•	•	•

- 1) Tairua (FR121/4): Eighteen PSP's established October 1994. Data available: Heights only, age 2, pruning measurements 1995, height and diameter annually from 1995.
Huanui (FR121/7): Eighteen PSP's to be established 1995/96. Data available: Heights only, age 2.

APPENDIX 29

Experimental design for unbalanced split-split block Silviculture/Breed Trial planted in 1990 at Hokonui (FR121/5).
Each dot represents one large plot with a PSP.¹⁾

Silviculture						Planting stock				
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings				
		Initial	Final	MCH (m)	Ratio	GF7 (FRI79/320) D	GF14 (88/105) C	GF16 (88/201) B	GF25 (89/708) A	LI25 (GF13) (89/15) E
1	4m	250	100	6.2	2.5:1	•	•	•	•	•
2	"	500	1200	6.2	2.5:1	•	•	•	•	•
3	"	1000	400	6.2	2.5:1	•			•	•
4	Unpruned	500	200	6.2	2.5:1	•			•	•
5	"	1000	400	6.2	2.5:1	•			•	•
6	"	1000	600	6.2	1.7:1	•			•	•
7	"	1000	1000	-	1:1	•	•	•	•	•

1) Hokonui (FR121/5): Twenty seven PSP's to be established 1996/97. Data available: Heights only, age 2.

APPENDIX 30

Experimental design for unbalanced split-split block Silviculture/Breed Trials planted in 1991 at Mangatu (FR121/8), Santoft (FR121/9), Blue Mountains (FR121/10), Darfield (FR121/11), Ashley (FR121/12), and Golden Downs (FR121/13).

Each dot represents one large plot with a PSP.1)

Silviculture					Planting stock					
Trt	Pruning	Stocking (stems/ha)		Thinning		Seedlings				
		Initial	Final	MCH (m)	Ratio	GF6 (88/102) D	GF14 (88/105) C	GF16 (88/201) B	GF25 (89/708) A	LI25 (GF13) (90/924) E
1	4m	250	100	6.2	2.5:1	•			•	•
2	"	500	200	6.2	2.5:1	•	•	•	•	•
3	"	1000	400	6.2	2.5:1	•			•	•
4	Unpruned	500	200	6.2	2.5:1	•			•	•
5	"	1000	400	6.2	2.5:1	•			•	•
6	"	1000	600	6.2	1.7:1	•			•	•
7	"	1000	1000	-	1:1	•	•	•	•	•

1) Twenty five PSP's be established 1995/1996 in Mangatu and Golden Downs. Data available: Heights only, age 2.

Twenty five PSP's to be established 1996/1997 in Santoft, Blue Mountains, Shellocks and Ashley. Data available: Heights only, age 2.