

# STAND GROWTH MODELLING COOPERATIVE REPORTS

AUGUST 1986 – December 2007

Rpt No.	Date	Author(s)	Title	PR No.	No. Pgs
1	Feb 1987	O. Garcia	Mortality in the Golden Downs model	1457	15
2	Feb 1987	R.G. Shula	Auckland clays radiata pine growth and yield model: Development, history and performance	1384	63
3	Mar 1987	A.G. Dunningham, M.E. Lawrence	An "interim" stand growth model for radiata pine grown on the Central North Island pumice plateau	1497	41
4	Aug 1991	J.C. Ellis, J.D. Dunlop	Minimum standards for collection of growth data from Permanent Sample Plots (Revision of 1987 report)	2092	33
5	Jun 1987	P.L. Wilcox	The retrospective sampling technique	1583	16
6	Oct 1987	R.G. Shula	Auckland clays growth model with phosphorus fertiliser effects	1688	41
7	Dec 1987	W. Hayward, D. New, I. Jenkin	Evaluation of the performance of growth models for Kaingaroa	1732	30
8	May 1988	M.E. Lawrence	A growth model for radiata pine grown in Canterbury	1862	38
9	Jul 1988	K.R.N. Law	SGM3: A revised version of the Southland growth model	1941	34
10	Oct 1988	P. Wilcox, J. Brown, S. Moore, M.J. Carson	Initial report on the growth performance of the genetically improved <i>Pinus radiata</i> breeds	2013	36
11	Oct 1989	P.L. Wilcox	Second orchard survey results	2284	35
12	Dec 1989	O. Garcia	The growth of thinned and pruned stands	2496	14
13	Feb 1990	M.E. Lawrence	Diameter distributions for the regional stand growth models	2369	25
14	Feb 1990	K.R.N. Law	A growth model for radiata pine grown in the Nelson/Marlborough region	2381	33
15	Mar 1990	K.R.N. Law	Permanent Sample Plot survey : radiata pine regional analysis (Growth plots)	2386	80
16	Jun 1990	K.R.N. Law	Permanent Sample Plot survey : radiata pine regional analysis (Experimental plots)	2470	70
17	May 1990	Liu Xu	Douglas-fir Central North Island growth model	2497	66
18	Jul 1990	K.R.N. Law	A growth model for Douglas-fir grown in the South Island	2488	34
19	Nov 1990	M.E. Lawrence	Investigations into the possible causes of bias in the Nelson growth model	2611	19
20	Apr 1991	N.T. Eggleston	Testing of log quality predictions	2735	32
21	Jun 1991	O. Garcia	Experience with automatic differentiation in estimating forest growth model parameters	2827	9
22	Jun 1991	G. West, B. Rawley, C. Goulding, W. Hayward	PSP future strategy committee report	2857	14
23	Oct 1991	O. Garcia	What is a diameter distribution?	3023	19
24	Oct 1991	S. Carson, M. Carson, P. Wilcox, M. Kimberley	Trials designed to quantify growth and yield gains from genetically improved radiata pine	3028	26
24a	Mar 1994	J. Skinner, S. Carson	Trials designed to quantify growth and yield gains from genetically improved radiata pine - An update	3894	34

Rpt No.	Date	Author(s)	Title	PR No.	No. Pgs
25	Nov 1991	N.T. Eggleston	Overview of model differences	3029	31
26	Mar 1992	O. Garcia	Sampling for tree ring analysis	3146	14
27	Jun 1992	N.T. Eggleston	Comparison of actual outturns of log grades with predicted values	3277	14
28	Jun 1992	J.C. Grace	Branch dynamics in radiata pine: Literature review	3280	17
29	Jul 1992	P. Maclaren, G. West, M. Kimberley	The divergence/convergence question	3279	45
30	Jul 1992	A.D. Gordon, M.E. Lawrence	A comparison of methods used to predict individual tree diameter growth	3278	21
31	Oct 1992	M.E. Lawrence	A comparison of the regional height models used in New Zealand	3359	8
32	Jun 1994	S. Carson, J. Dunlop, J.A. Skinner	Establishment report for the 1987 silviculture/breeds trials	3924	41
33	Apr 1994	M.E. Lawrence	Hawkes Bay growth model documentation	3926	20
34	Apr 1994	A.D. Gordon, M.E. Lawrence	Projecting inventory data: predicting individual tree diameter growth	3927	32
35	Jun 1994	S. Carson, O Garcia, M. Kimberley, J.A. Skinner	Genetic gain in radiata pine expressed as growth rate multipliers	4001	79
36	Jun 1994	A.G.D. Whyte	Otago/Southland tree volume equations		20
37	Jun 1994	J.C. Grace	Methodology for collecting branch growth data	4003	16
38	Jun 1994	J.C. Grace	Growth variation among sites: a modelling perspective	3625	16
39	Jul 1994	J.C. Grace	Relationship between environmental variables and radiata pine growth in the Canterbury growth modelling region	4083	15
40	Jun 1995	J. Dunlop, S.D. Carson	Trials designed to quantify growth and yield gains from genetically improved radiata pine - Second revision.	4713	70
41	Jun 1995	R.B. Tennent	An examination of the validity of three Douglas-fir growth models.	4425	14
42	Jul 1995	S. Carson, M. Carson, G. West, J. Grace, T. Vincent, B. Manley	A strategy for efficient selection and evaluation of 'Designer Breeds'	4858	16
43	Aug 1995	S. Kumar, S. Carson, L. Gea, F. Burger, P. Jefferson	Best linear prediction of breeding values for stem diameter in a <i>Pinus radiata</i> improvement programme	4885	27
44	Sep 1995	S.D. Carson, J.D. Dunlop	Validation of growth rate multipliers for the SANDS and NAPIRAD models	4901	56
45	Nov 1995	J.C. Grace	Modelling the position of branch cluster in radiata pine: progress report	4724	17
46	Mar 1996	J.D. Dunlop, S.D. Carson	PSP establishment report for the 1988 silviculture/breed trials	5072	32
47	Apr 1996	A.D. Gordon	Projecting inventory data: predicting individual tree height growth	5028	17
48	Apr 1996	C. Lundgren, J.C. Grace	Modelling stem cone occurrence, number of branches in a cluster and cluster depth for radiata pine: progress to January 1996	5000	31

Rpt No.	Date	Author(s)	Title	PR No.	No. Pgs
49	May 1996	S.D. Carson, J.D. Dunlop	Diameter and height distributions in improved and unimproved <i>Pinus radiata</i>	5246	47
50	June 1996	J.C. Grace	Diameter of branches within a cluster in Expt RO 696	5178	29
51	June 1996	J.C. Grace	Branch diameter growth in radiata pine in Expt RO 696	5179	45
52	June 1996	J.C. Grace, W. Blundell C. Lundgren,	Branching characteristics of radiata pine in Expt RO 905: data collection	5176	17
53	Mar 1997	S. Carson, J.D. Dunlop, O. Garcia	Second estimation of genetic gain multipliers using data from 1978-1980 large-block genetic gain trials	?	48
54	Feb 1997	C. Lundgren, A.D. Gordon	Modelling individual tree survival of radiata pine in NZ: progress to July 1996	5534	35
55	June 1997	J.C. Grace	Features of radiata pine branching	5707	17
56	Sept 1997	D. Pont	Prototype branch growth model - demonstration program User Guide	5907	20
57	Sept 1997	S. Carson, J.D. Hayes, M. Kimberley, M.J. Carson	The effect of silviculture on genetic gain in growth of <i>Pinus radiata</i> at one-third rotation	5906	26
58	Nov 1997	R.G. Shula	Projecting inventory data: revised individual-tree diameter growth equations	5914	21
59	Nov 1997	R.G. Shula	Projecting inventory data: revised individual-tree static height equation	5915	23
60	Dec 1997	R.G. Shula	Modelling individual-tree probability of survival of unthinned radiata pine	5971	33
61	Apr 1998	J.C. Grace, D. Pont	Modelling branch development in radiata pine	6060	15
62	Apr 1998	J.C. Grace	Influence of thinning on branch diameter distributions and branch growth	5930, 5931	52
63	Apr 1998	J. Grace, M. Budianto, W. Blundell, D. Pont, D. Duyvesteyn	Branching characteristics of radiata pine in compartment 905, Kaingaroa: data collection	6061	13
64	Apr 1998	J.C. Grace	Branch growth and mortality in radiata pine : data analysis	6073	38
65	Apr 1998	M. Budianto, J.C. Grace	Modelling the position of the branch pith through time	6051	33
66	Jul 1998	J.C. Grace	Branching characteristics of radiata pine: Number and position of branch clusters within annual shoots	6193	34
67	Jul 1998	J.C. Grace	Bark inclusion above live radiata pine branches	6163	18
68	Jul 1999	M. Budianto	Modelling stem cone occurrence and no. of branches within a cluster		33
69	Jul 1998	J.D. Hayes, S.D.Carson, G. Vincent	Growth, straightness and branching <i>GFPLUS<sup>TM</sup></i> values for seedlots in large-block genetic gain trials	6227	12
70	Nov 1998	J.D. Hayes, S.D.Carson	Trials designed to quantify growth and yield gains from genetically improved radiata pine - Third revision.		46
71	Nov 1998	J.D. Hayes, C. Andersen	Establishment report for the 1989 silviculture/breed trials		41
72	Feb 1999	M. Budianto	Branch diameter growth in compartment 905 (Kaingaroa) and Taringatura (Southland)		17
73	May 1999	J.C. Grace	Implications of branch arrangement for PHOTOMARVL		31

Rpt No.	Date	Author(s)	Title	PR No.	No. Pgs
74	Jun 1999	J.C. Grace	Azimuth angle of the largest branch in the cluster		31
75	Nov 1998	J.C. Grace, D. Pont, C.Goulding, B. Rawley	What is an appropriate level to model branch development for forest management?		15
76	Mar 1999	J.C. Grace, D. Pont, M.Budianto, M.Lawson R. Brownlie	Branching Characteristics of Radiata pine at Taringatura and Woodhill		26
77	Feb 1999	A.Gordon, B. Shula	A guide to using the individual-tree growth model		12
78	Feb 1999	S.D. Carson, R. Woollons	Genetic Gain Multipliers: utility and efficiency		21
79	Dec 2000	B. Shula, A. Gordon	Validation of the Individual-tree growth model (ITGM)	31913	43
82	Oct 1999	D. Pont, J.C. Grace, C. Todoroki	Modelling the influence of Radiata pine branching characteristics on visual timber grades	30143	14
83	Mar 2000	J.D. Hayes	Establishment report for the 1990 silviculture/breed trials	30745	48
84	Jun 2000	J.D. Hayes	Establishment report for the 1991 silviculture/breed trials	31147	45
86	Nov 2002	J.C. Grace	Kaingaroa data collection and analysis : Expt RO 2098	31150	20
87	Nov 2002	J.C. Grace	Hawkes Bay data collection and analysis : WN 235/0/31/0	31152	16
88	Nov 2002	J.C. Grace	Marlborough data collection and analysis : NN 469/0/77/8	31151	14
89	Jun 2000	J. Hayes, P. Jefferson, B. Shula	Joint Cooperative Technical Session – 15 March 2000, Nelson		128
90	Aug 2000	J.C. Grace	Branch diameter growth – Progress report 1999	31097	33
92	Aug 2000	D. Pont, J.C. Grace, B. Shula, A. Gordon	A guide to using TreeBLOSSIM	31098	21
93	Sep 2000	J.C. Grace, R. Brownlie	Suitability of PhotoMARVL for measuring crown structure	31095	32
94	Aug 2000	J.C. Grace	Expanding MARVL branch codes to provide a more complete description of the tree crown	31096	20
95	Apr 2003	B. Shula, J.D. Hayes	Validation of the use of growth rate multipliers associated with breeding values for diameter to predict growth	34759	27
96	Jan 2001	B. Shula, J.D. Hayes	PSP Matrix development	31912	22
98	Sep 2001	J.C. Grace	Influence of site and genetics on branch diameter at time of pruning	32828	15
99	Jun 2001	J.C. Grace, R.K. Brownlie	Use of PhotoMARVL to determine response to thinning: Further results from Expt. RO 2098 (Kaingaroa)	32352	
100	Jun 2001	J.D. Hayes	Trials designed to quantify growth and yield gains from genetically improved radiata pine - Fourth revision	32488	61
101	May 2001	J.D. Hayes	Establishment report for the 1992 Special-purpose Breeds trials	32025	45
102	Jun 2001	J.C. Grace	Observations on branching in Otago Coast Forest	32353	15
103	Jun 2001	J.D. Hayes	Workplan for trials with genetically improved radiata pine planted between 1978 and 1994	32025	60
104	Sep 2001	J.C. Grace, R.K. Brownlie	Branch response to thinning in Expt. CY 597 – Results from using PhotoMARVL	32829	28
105	Sep 2001	J.C. Grace, M. Budianto	TreeBLOSSIM sensitivity – comparison of TreeBLOSSIM predictions with branch data from the Branch Index Database (BIX)	32827	7

<b>Rpt No.</b>	<b>Date</b>	<b>Author(s)</b>	<b>Title</b>	<b>PR No.</b>	<b>No. Pgs</b>
106	Sep 2001	J.D. Hayes	Establishment report for the 1994 special-purpose breed trials	32865	30
107	Dec 2001	J.D. Hayes	Special-purpose Breed Trials – Form assessments	33046	14
108	Dec 2001	J.C. Grace, D. Pont	Branch functions within TreeBLOSSIM – Version 1.1	33122	25
109	Dec 2001	J.C. Grace	Comparison of TreeBLOSSIM predictions with inventory data: Hawkes Bay forests	33123	15
110	Dec 2001	J.C. Grace	Sensitivity analysis of TreeBLOSSIM: PhotoMARVL trees from Experiment RO2098	33124	27
112	Jul 2002	J.C. Grace, R.K. Brownlie	Branch response to thinning in Woodhill (AK1056) and Golden Downs (NN529) – PhotoMARVL data	33778	45
113	Apr 2002	D. Pont, J.C. Grace, A. Gordon, B. Shula	A guide to using TreeBLOSSIM – Version 1.2		21
114	June 2003	J.C. Grace	Linking tree growth to end-product performance: Literature Review and proposed modelling strategy	35378	47
115	June 2003	D. Duyvesteyn, J.C. Grace	Field procedure for collecting branch data for sensitivity analysis of TreeBLOSSIM	35157	11
116	June 2003	J.C. Grace, R.K. Brownlie	Sensitivity analysis of TreeBLOSSIM: PhotoMARVL trees from Expt AK1056 (WOOD) and NN529/1 (GDNS)	35155	40
117	June 2003	J.C. Grace, R.K. Brownlie	Sensitivity analysis of TreeBLOSSIM: PhotoMARVL trees from Expt CY597 (Eyrewell)	35156	27
118	Sept 2003	J.C. Grace, R.K. Brownlie	Te Marua Forest, East Coast Region, North Island: Comparison of PhotoMARVL data and TreeBLOSSIM predictions	35536	6
119	Nov 2003	J.C. Grace, T. Evanson, R.K. Brownlie	PhotoMARVL assessment of branching in 1978 Genetic Gain Trials	35563	17
120	Nov 2003	J.C. Grace, T. Evanson, R.K. Brownlie	Comparison of PhotoMARVL data with TreeBLOSSIM predictions: 1978 Genetic Gain Trial Data	35564	29
121	Aug 2003	C. Low, M. Miller	First assessment of 1992 and 1994 Special Purpose Breeds trials: RPBC Report 137	33046	16
122	Apr 2004	D. Pont, J.C. Grace, A. Gordon, B. Shula	A guide to using TreeBLOSSIM – Version 2.0		
123	Sep 2004	J.C. Grace, J.D. Hayes	Comparison of tree growth in 1975 FCS trials and 1978 GG trials	37370	33
124	Sep 2004	H. Dungey, J.D. Hayes, R.G. Shula	Towards the next generation of modelling trials	37268	8
125	Apr 2005	J.C. Grace	Branch Functions within TreeBLOSSIM Version 3	37860	45
126	Apr 2005	J.C. Grace, J.D. Hayes, C. Andersen	Pilot Study for Internal Stem Modelling : Data Collection	37842	27
127	Apr 2006	J.C. Grace	Pilot study for Internal Stem Modelling: summary of data collected in FR172/3	39458	56
128	Jan 2006	H. Dungey, J.D. Hayes, J. Grace, L. Blomquist	Growth Model development of radiata pine clones: A Gap analysis	38989	25
129	Jan 2007	J.D. Hayes, R.G. Shula	Trouble-shooting for tree-level models	40904	23
131	Aug 2006	D. Pont	Pilot Study for Internal Stem Modelling: Evaluation of relationships between crown, ring area and basic density	39710	20
132	Oct 2006	D. Pont	Nelson Study for Internal Stem Modelling: Evaluation of relationships between crown, ring area and basic density	39711	20

<b>Rpt No.</b>	<b>Date</b>	<b>Author(s)</b>	<b>Title</b>	<b>PR No.</b>	<b>No. Pgs</b>
133	Jun 2007	J.C. Grace, M. Nagel R.K. Brownlie	Comparison of TreeBLOSSIM predictions with PhotoMARVL data: FR8, FR10, FR54 and FR84	41215	78
134	Dec 2006	J.C. Grace, R.K. Brownlie	Comparison of TreeBLOSSIM predictions with PhotoMARVL data: Hawkes Bay Response Surface Trial WN364	40493	28
135	Dec 2006	J.C. Grace, R.K. Brownlie	Comparison of TreeBLOSSIM predictions with field measurements: FR121/4 (Tairua) and FR121/7 (Huanui)	40375	26
136	Dec 2006	J.C. Grace, P. Hodgkiss R.K. Brownlie, L. Blomquist	Comparison of TreeD measurements of branching with TreeBLOSSIM predictions: Westland	40496	19
137	Dec 2006	J.C. Grace, P. Hodgkiss R.K. Brownlie, L. Blomquist	Branching characteristics of Radiata Pine in Southland as measured by TreeD	40498	18
138	Dec 2006	J.C. Grace, C. Andersen	Stem damage in Stand Growth Modelling Cooperative Trials	40503	25
139	Dec 2006	J.C. Grace	Influence of silviculture and seedlot on crown structure and stem wood properties: Shellocks FR121/11	40500	27
140	Feb 2007	J.C. Grace, J.D. Hayes	SGMC Modelling Strategy Project 2006/2007	40689	24
141	May 2007	P. Gorman, B. Rawley, J. Wilson, F. Schipper, P. Milne, J. Schnell	Growth Modelling Strategy – Industry Research Requirements	41041	11
142	Jun 2007	J.C. Grace, R.K. Brownlie, L. Blomquist	Comparison of TreeBLOSSIM predictions with PhotoMARVL/TreeD data: FR121/1, FR121/3, FR121/13	41221	23
143	Sep 2007	J.C. Grace, L. Blomquist	Performance of Post-silvicultural Individual-Tree Growth Model (ITGM)	41764	12
144	Jun 2007	J.C. Grace, C. Andersen	Location of SGMC trials and study sites with respect to Land Environments of New Zealand	41208	34
145	Aug 2007	J.C. Grace	Radiata pine crown development: Model, model performance, and incorporation into forest inventory	41550	19
146	Sep 2007	J.C. Grace	Branching Characteristics and Wood Property Variation: GF14 seedlot, 1978 Genetic Gain Trial, NN530/2, Golden Downs	41766	19
147	Sep 2007	J.C. Grace	Crown and wood property: Mohaka, WN377	41765	27
148	Sep 2007	J.C. Grace, R.K. Brownlie	Comparison of TreeBLOSSIM predictions with TreeD data: FR121/2 (Kinleith)	41767	12
149	Dec 2007	J.C. Grace, M. Nagel	Tree Growth in 1987, 1990 and 1991 Silviculture Breed Trials	42304	27
150	Dec 2007	J.C. Grace	Radiata pine crown architecture: Summary of SGMC research and future opportunities	42297	10

## **SGMC/WQI Joint Reports**

<b>Report 1a</b>	<b>Prescreening of Genetic Gain Trials for outer wood density McKinley, Cown</b>
<b>Report 2a</b>	<b>Benchmarking Study – Aupouri Forest McKinley, Cown, Jones</b>
<b>Report 2c</b>	<b>Benchmarking Study – Mohaka Forest McKinley, Cown, Jones</b>
<b>Report 2d</b>	<b>Benchmarking Study – Golden Downs Forest McKinley, Cown, Jones</b>
<b>Report 2e</b>	<b>Benchmarking Study – Southland Forest McKinley, Cown, Jones</b>
<b>Report 3</b>	<b>Utilisation Study – Kaingaroa and Golden Downs Forests Cown, Downes, McKinley, Kimberley, Turner, Lee, Holden</b>

### Published Articles:

- Report No. 6     Stand Growth Model with P Fertiliser Effects For Radiata Pine on Clay Soil. FRI Bulletin No. 148
- Report No. 12    IUFRO Conference, NZ, April 1989 - New approaches to spacing and thinning in plantation forestry. FRI Bulletin No. 151
- Report No. 21    Proceedings of the SIAM Workshop on Automatic Differentiation of Algorithms, Breckenridge, Colorado, January 6-8, 1991
- Report No. 23    IUFRO Symposium proceedings - Integrated Forest Management Information Systems, Tsubaka, Japan, October 13-18, 1991
- Report No. 26    IUFRO Conference - Integrating forest Information over space and time, Canberra, Australia, January 1992
- Report No. 49    Diameter and height distributions in improved and unimproved *Pinus radiata*. Canadian Journal of Forest Research, Vol 28:2, Pp 248-258. S.D. Carson and J.D. Hayes
- Report No. 53    Realised gain and prediction of yield with genetically improved *Pinus radiata* in New Zealand. Forest Science 45(2) 1999 S.D. Carson, O. Garcia and J.D. Hayes
- Report No. 57    The effect of silviculture on genetic gain growth of *Pinus radiata* at one-third rotation. Canadian Journal of Forest Research Vol 29, Pp 1979-1984, 1999. S.D. Carson, M.O. Kimberley, J.D. Hayes and M.J. Carson
- Report No. 61    Conference proceedings - Empirical and process-based models for forest, tree and stand growth simulation, Oieras, Portugal, 21-27 September 1997
- Report No. 75    Conference proceedings - Process-based models for forest management, Finland, August/September 1998
- Report No. 95    ‘Hybrid breeding and genetics of forest trees’ Proceedings of QFRI/CRC-SPF Symposium, 9-14 April 2000, Noosa, Queensland, Australia
- Report No. 145 IUFRO Conference – Forest growth and wood quality, Portland, Oregon, 7-10 August 2007