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Wethers at Bookham

Property: Kia Ora Number of paddocks	11	I
Total area	100 ha	
Weather: Yass (NSW)	-	
Weather station	Yass (NSW) 11 Jan 1966 to 31 Dec 2007	
Paddock: Fertilised paddock	1 3aii 1900 to 31 Dec 2007	
Area	100.0 ha	l
Steepness	Gentle	
Fertility Reduce wind to	VARIABLE	
Soil: Kia Ora Soil	1.00%	l
Soil albedo	0.17	
Soil evaporation	3.5 mm/d ^{1/5}	
	Topsoil	Subsoil
Cumulative depth (mm)	460	1000
Field capacity (m³/m³)	0.24	0.33
Wilting point (m³/m³)	0.06	0.28 1.7
Bulk density (Mg/m³) Saturated conductivity (mm/hr)	62.31	0.01
Initial water (m³/m³)	0.14	0.32
Pasture		
Legume proportion fixed at	15%	
Population	Annual Ryegrass	
Phenology	Senescent	
Live DM (kg/ha)	2000	
Standing dead DM (kg/ha) Litter DM (kg/ha)	2000	
Below ground DM (kg/ha)	0	
Max. rooting depth (mm)	550 200	
Seed DM (kg/ha) Livestock	200	
Breed	Medium Merino	
Standard reference weight		kg
Greasy fleece weight		kg microns
Fibre diameter Fleece yield	73	
Death rate: adults		%/year
Death rate: weaners	L.	%/year
Management policy: Wether man Stocking rate	VARIABLE	
Shearing date	25-Nov	
	Rule	Purchase wethers on 25 Nov at age 15
Replacement rule	Rule	months, live weight 45 kg and C.S. 2.5
Replacement rule	Rule Cast for age	
	Cast for age Feed in paddock, applying the rules:	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov
Replacement rule Maintenance Feeding rule	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov
Replacement rule	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the
Replacement rule Maintenance Feeding rule	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the
Replacement rule Maintenance Feeding rule Main flock	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule:	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the
Replacement rule Maintenance Feeding rule	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the
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Replacement rule Maintenance Feeding rule Main flock	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: V	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole
Replacement rule Maintenance Feeding rule Main flock Weaner stock	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: V Ingredient Proportion of mix (%)	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100
Replacement rule Maintenance Feeding rule Main flock	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Valingredient Proportion of mix (%) Dry matter content (%)	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89
Replacement rule Maintenance Feeding rule Main flock Weaner stock	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the rule of the rul	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100
Replacement rule Maintenance Feeding rule Main flock Weaner stock	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg)	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7
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Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of value of the v	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry	Cast for age Feed in paddock, applying the rules:	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales cost Pasture costs	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of value of the value of	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole)	Cast for age Feed in paddock, applying the rules:	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales cost Pasture costs	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Variable of the value of value of the value of value of the value of the value of the value of value	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole)	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of value of the value of	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole)	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 0.0 during 1 Jan to thinnest animals Supplement: Variable V	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85 //head
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole) Prices: Merino prices -general	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of value of the value of the value of the value of va	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the Whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole) Prices: Merino prices -general	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of value of the value of value of the value	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85 //head
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole) Prices: Merino prices -general	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of value of the value of the value of the value of va	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the Whole barley Barley, whole 100 89 90 13.7 12 85
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole) Prices: Merino prices -general	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 0.0 during 1 Jan to thinnest animals Supplement: Value of the condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the condition	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the whole barley Barley, whole 100 89 90 13.7 12 85 /head
Replacement rule Maintenance Feeding rule Main flock Weaner stock Supplement Pasture rule Do not reset pasture Costs: Sheep costs -Merino Wether Shearing Wether Husbandry Wether Replacement Sheep sales cost Sheep sales cost Pasture costs Supplement costs (Barley, whole) Prices: Merino prices -general Wool prices for wethers	Cast for age Feed in paddock, applying the rules: If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 0.5 during 1 Jan to thinnest animals Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to thinnest animals Supplement: Value of the value of value of the value of valu	months, live weight 45 kg and C.S. 2.5 Sell stock aged 6 to 7 years on 25 Nov 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the Whole barley Barley, whole 100 89 90 13.7 12 85

Self-replacing Merinos at Bookham

Property: Kia Ora		
Number of paddocks Total area	1 100 ha	
Weather: Yass (NSW)		
Weather station Data period	Yass (NSW) 1 Jan 1966 to 31 Dec 2007	
Paddock: Fertilised paddock		ı
Area Steepness	100.0 ha Gentle	
Fertility	VARIABLE	
Reduce wind to Soil: Kia Ora Soil	100%	
Soil albedo	0.17	l
Soil evaporation	3.5 mm/d [%]	
	Topsoil	Subsoil
Cumulative depth (mm)	460	1000
Field capacity (m³/m³) Vilting point (m³/m³)	0.24 0.06	0.33 0.28
Bulk density (Mg/m³)	1.36	1.7
Saturated conductivity (mm/hr) nitial water (m³/m³)	62.31 0.14	0.01
Pasture	0.14	0.02
egume proportion fixed at	15%	
opulation	Annual Ryegrass	
Phenology	Senescent	
.ive DM (kg/ha) Standing dead DM (kg/ha)	2000	
itter DM (kg/ha)	500	
Below ground DM (kg/ha) Max. rooting depth (mm)	0 550	
Seed DM (kg/ha)	200	
Livestock	Medium Merino	
Breed Standard reference weight	47	kg
Greasy fleece weight	4.5	kg microns
ibre diameter leece yield	73	
Ram breed	Medium Merino (Mature ram: 65.8 kg)	%/year
Death rate: adults Death rate: weaners		%/year
Management policy: Merion		
Stocking rate Shearing date	VARIABLE 25-Nov	
	Rule	Self-replacing each 1 Jan
Replacement rule	Cast for age	Sell stock aged 5 to 6 years on 31 Dec
Reproduction rule		
First join at Birth date	1 years 11-Aug	
Conception at CS 3	(singles) 64%	
·	(twins) 30%	
Veaning date	24-Nov	
One ram per Keep rams for	100 ewes 4.0 years	
Sell young stock	Sell 0 year old animals on 31 Dec	
Maintenance Feeding rule		
	Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to	31 Dec feed to maintain weight of
Main flock	average animals	
	If animal condition falls to 2.0 during 1 Jan to thinnest animals	31 Dec feed to maintain condition of the
	Feed in paddock, applying the rules:	
M	iii animai condition fails to 2.0 during 1 Jan to	31 Dec feed to maintain weight of the
veaner stock	thinnest animals	
veaner stock	thinnest animals If animal condition falls to 1.5 during 1 Jan to	31 Dec feed to maintain condition of the
veaner stock	thinnest animals	
veaner stock	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals	vhole barley Barley, whole
	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%)	whole barley Barley, whole 100
	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%)	vhole barley Barley, whole
	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter cipestibility (%) ME:DM (MJ/kg)	whole barley Barley, whole 100 89 90 13.7
	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%)	whole barley Barley, whole 100 89 90 13.7 12
	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter cipestibility (%) ME:DM (MJ/kg)	whole barley Barley, whole 100 89 90 13.7
Supplement Pasture rule 20 not reset pasture	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%)	whole barley Barley, whole 100 89 90 13.7 12
Pasture rule Do not reset pasture Costs: Sheep costs -Merino	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%)	whole barley Barley, whole 100 89 90 13.7 12
Pasture rule Do not reset pasture Costs: Sheep costs -Merino Swe Shearing	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50	vhole barley Barley, whole 100 89 90 13.7 12 85
Pasture rule Do not reset pasture Costs: Sheep costs -Merino Swe Shearing Shearing Lambs We Husbandry	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50	whole barley Barley, whole 100 89 90 13.7 12 85
Pasture rule Do not reset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Ewe Husbandry amb Husbandry	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$2.00	## State
Pasture rule to not reset pasture Costs: Sheep costs -Merino twe Shearing thearing Lambs thearing Lambs twe Husbandry amb Husbandry twe Replacement	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter cipestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.00 \$60.00 \$80.00 \$80.00	## State
Pasture rule to not reset pasture Costs: Sheep costs -Merino twe Shearing thearing Lambs twe Husbandry amb Husbandry twe Replacement tams theep sales commission theep sales cost	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$2.50 \$80.00 \$800.00 \$800.00	### Whole barley Barley, whole
Pasture rule On not reset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Wee Husbandry Lamb Hus	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$ 5.00 \$ 2.50 \$ 2.00 \$ 80.000 \$ 80.000 \$ \$ 2.00	### Whole barley Barley, whole
Pasture rule On not reset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Wee Husbandry Lamb Hus	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$2.50 \$2.50 \$8.00 \$80.00 \$800.00 \$800.00 \$5.20 VARIABLE	## State
Pasture rule On not reset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Wee Husbandry Lamb Hus	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$ 50.00 \$ 2.50 \$ 2.20 \$ 50.00 \$ 80.000 \$ \$ 2.00 \$ \$ 30.00 \$ \$	## State
Pasture rule On not reset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Wee Husbandry Lamb Hus	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$2.50 \$2.50 \$8.00 \$80.00 \$800.00 \$800.00 \$5.20 VARIABLE	## State
Pasture rule On not reset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Wee Husbandry Lamb Hus	thinnest animals II animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$ 5.00 \$ 2.50 \$ 2.50 \$ 2.50 \$ \$2.00 \$ \$80.00 \$ \$2	## State
Pasture rule Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Shearing Lambs Wee Husbandry Lamb Husbandry	thinnest animals II animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter cites the display of the disp	### Whole barley Barley, whole
Pasture rule Pasture rule Costs: Sheep costs -Merino We Shearing Hospital Sheep sales commission Sheep sales commission Sheep sales cost Pasture costs Pasture costs Parture costs Parture sales (Barley, whole) Prices: Merino prices -general Nool prices for ewes	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$2.50 \$2.50 \$2.50 \$2.50 \$2.50 \$2.00 VARIABLE \$320.00 18 micron 19 micron 21 micron Av. Flesco Price Wool commission Base price Dressing percentage	## State
Constreset pasture Costs: Sheep costs -Merino Ewe Shearing Shearing Lambs Ewe Husbandry Ewe Replacement Tamb Sheep sales commission Sheep sales cost Pasture costs Supplement costs (Barley, whole)	thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter cigestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.00 \$60.00 \$80.00 \$80.00 \$0.	### ##################################
Pasture rule Costs: Sheep costs -Merino Ewe Shearing Hearing Lambs Ewe Husbandry Ewe Replacement Even Besides Costs Even Besides Cost Even	thinnest animals II animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: v Ingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$5.250 \$2.00 \$80.00 \$5.250 \$2.00 \$80.00 \$5.250 \$2.00 \$80.00 \$5.250 \$2.00 \$5.250 \$2.00 \$5.250 \$2.00 \$5.250 \$2.00 \$5.250 \$2.00 \$5.250 \$2.00 \$5.250 \$2.00 \$5.250	### ##################################

Crossbred ewes at Bookham

Crossbred ewes at Bo Property: Kia Ora		
lumber of paddocks	1	
otal area	100 ha	
Weather: Yass (NSW)		
Veather station	Yass (NSW)	
Paddock: Fertilised paddock	1 Jan 1966 to 31 Dec 2007	
	[100.0 ha	I
Area Steepness	Gentle	
ertility	VARIABLE	
educe wind to	100%	
Soil: Kia Ora Soil		•
oil albedo	0.17	
oil evaporation	3.5 mm/d ³⁵	
	Topsoil	Subsoil
umulative depth (mm)	460	1000
ield capacity (m³/m³)	0.24	0.33
/ilting point (m³/m³)	0.06	0.28
ulk density (Mg/m³)	1.36	1.7
aturated conductivity (mm/hr)	62.31	0.01
itial water (m³/m³)	0.14	0.32
Pasture		
egume proportion fixed at	15%	
opulation	Annual Ryegrass Senescent	
nenology ve DM (kg/ha)	Seriescerii 0	
anding dead DM (kg/ha)	2000	
tter DM (kg/ha)	500	
elow ground DM (kg/ha)	0	
ax. rooting depth (mm)	550	
eed DM (kg/ha)	200	
Livestock	Border Leicester x Merino	
reed tandard reference weight		kg
reasy fleece weight	3.8	
bre diameter	26	microns
leece yield		%
am breed	Dorset (Mature ram: 110.0 kg)	0/ /
eath rate: adults		%/year %/year
leath rate: weaners Management policy: XB ewe ma		70 year
tocking rate	VARIABLE	
hearing date	25-Nov	
5		Purchase ewes on 1 Dec at age 18
eplacement rule	Rule	months, live weight 50 kg and C.S. 2.5
	Cast for age	Sell stock aged 5 to 6 years on 30 Nov
Reproduction rule		
irst join at	1 years	
irth date	11-Aug	
	11 Aug	
onception at CS 3	(singles) 49%	
onception at CS 3		
·	(singles) 49%	
eaning date	(singles) 49% (twins) 45%	
leaning date ne ram per	(singles) 49% (twins) 45% 24-Nov	
feaning date ne ram per eep rams for	(singles) 49% (twins) 45% 24-Nov 100 ewes	
Veaning date ne ram per eep rams for	(singles) 49% (twins) 45% 24-Nov 100 ewes 4.0 years	
feaning date the ram per deep rams for ell young stock	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules:	
feaning date me ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% (twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: It animal condition falls to 2.5 during 1 Jan to	31 Dec feed to maintain weight of
feaning date me ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules:	
Veaning date the ram per teep rams for ell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals	
Veaning date the ram per teep rams for ell young stock Maintenance Feeding rule	(singles) 49% (twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules:	31 Dec feed to maintain condition of the
feaning date me ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% (twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals	31 Dec feed to maintain condition of the
feaning date ne ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the
feaning date me ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals Ilf animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the
feaning date me ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 140 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: N	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley
feaning date ne ram per eep rams for ell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: Vingredient	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole
eaning date ne ram per sep rams for sell young stock Maintenance Feeding rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the vhole barley Barley, whole 100
eaning date ne ram per sep rams for sell young stock Maintenance Feeding rule ain flock eaner stock	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: Value of the condition of the condition of the condition of the condition falls to 1.5 during 1 Jan to thinnest animals	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 89
eaning date ne ram per sep rams for sell young stock Maintenance Feeding rule ain flock eaner stock	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 4 Sarley, whole 4 Dec feed to maintain condition of the 4 Sarley, whole 5 Sarley, 9 Sarley 8 Sarley 9 S
eaning date ne ram per sep rams for sell young stock Maintenance Feeding rule ain flock eaner stock	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: Vingredient Proportion of mix (%) Dry matter content (%) Dry matter content (%) Dry matter digestibility (%) ME::DM (MJ/kg)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the vhole barley Barley, whole 100 89 90 13.7
eaning date ne ram per sep rams for sell young stock Maintenance Feeding rule ain flock eaner stock	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MJ/kg) Grude protein (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 4 Sarley, whole 4 Dec feed to maintain condition of the 4 Sarley, whole 5 Sarley, 9 Sarley 8 Sarley 90
reaning date ne ram per seep rams for sell young stock Maintenance Feeding rule ain flock seaner stock upplement	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: Vingredient Proportion of mix (%) Dry matter content (%) Dry matter content (%) Dry matter digestibility (%) ME::DM (MJ/kg)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 83 90 13.7 12
reaning date ne ram per eep rams for ell young stock Maintenance Feeding rule ain flock reaner stock upplement Pasture rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MJ/kg) Grude protein (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 83 90 13.7 12
reaning date ne ram per eep rams for ell young stock Maintenance Feeding rule ain flock reaner stock upplement Pasture rule	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MJ/kg) Grude protein (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 83 90 13.7 12
reaning date me ram per eep rams for ell young stock Maintenance Feeding rule tain flock /eaner stock upplement Pasture rule o not reset pasture Costs	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: It animal condition falls to 2.5 during 1 Jan to average animals It animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: \(\mathbf{V} \) Ingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MyKg) Crude protein (%) Rumen-degradable protein (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the vhole barley Barley, whole 100 89 90 13.7 12 85
reaning date me ram per eep rams for ell young stock Maintenance Feeding rule lain flock reaner stock Pasture rule o not reset pasture Costs we Shearing hearing Lambs	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to taverage animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter content (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%)	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 89 90 13.7 12 85
reaning date me ram per eep rams for ell young stock Maintenance Feeding rule lain flock reaner stock Pasture rule o not reset pasture Costs we Shearing hearing Lambs we Husbandry	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: It animal condition falls to 2.5 during 1 Jan to average animals It animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Ingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MyKg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the vhole barley Barley, whole 100 89 90 13.7 12 85
reaning date ne ram per eep rams for ell young stock Maintenance Feeding rule ain flock feaner stock Pasture rule o not reset pasture Costs we Shearing hearing Lambs we Husbandry	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$2.50	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the vhole barley Barley, whole 100 89 90 13.7 12 85
reaning date me ram per eep rams for ell young stock Maintenance Feeding rule tain flock reaner stock Pasture rule o not reset pasture Costs we Shearing hearing Lambs we Husbandry amb Husbandry we Replacement	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: It animal condition falls to 2.5 during 1 Jan to average animals It animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Ingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MyKg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 89 90 13.7 12 85
Jeaning date Jeaning date Jeaning date Jeaning per Jeaning for Jeaning stock Maintenance Feeding rule Jeaning flock Jeaner stock Jeaner stock Jeaner stock Pasture rule Jeaning Lambs J	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$80.00 \$80.00	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the whole barley Barley, whole 100 89 90 13.7 12 85
Main flock Veaner stock Supplement Pasture rule Do not reset pasture	(singles) 49% ((twins) 45% 24-Nov 100 ewes 4.0 years Sell 0 year old animals on 31 Dec Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to average animals If animal condition falls to 2.0 during 1 Jan to thinnest animals Feed in paddock, applying the rules: If animal condition falls to 2.0 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals If animal condition falls to 1.5 during 1 Jan to thinnest animals Supplement: vingredient Proportion of mix (%) Dry matter digestibility (%) ME:DM (MJ/kg) Crude protein (%) ME:DM (MJ/kg) Crude protein (%) Rumen-degradable protein (%) \$6.00 \$2.50 \$2.50 \$80.00 \$80.00	31 Dec feed to maintain condition of the 31 Dec feed to maintain weight of the 31 Dec feed to maintain condition of the vhole barley Barley, whole 100 89 90 13.7 12 85

Sheep sales commission		5 %
Sheep sales cost	\$2.0	00 /head
Pasture costs	VARIABLE	
Supplement costs (Barley, whole)	\$320.0	00 /t
Prices		
	21 micron	893 c/kg
Wool prices for ewes	25 micron	680 c/kg
·	30 micron	478 c/kg
	Av. Fleece Price	85 %
	Wool commission	5 %
	Base price	175 c/kg
Ewe sales	Dressing percentage	45 %
	Skin price	\$3.00 /head
	Base price	320 c/kg
Lamb sales	Dressing percentage	42 %
	Skin price	\$5.00 /head

Wethers at Hamilton

Property: Hamilton	
Number of paddocks	1
Total area	100 ha
Weather: Hamilton (VIC)	
Weather station	Hamilton (VIC)
Data period	1 Jan 1966 to 31 Dec 2007
Paddock: Fertilised paddock	
Area	100.0 ha
Steepness	Level
Fertility	VARIABLE
Reduce wind to	100%

VARIABLE
100%
0.17
3.3 mm/d ^{1/4}

	Topsoil	Subsoil
Cumulative depth (mm)	300	1000
Field capacity (m³/m³)	0.31	0.42
Wilting point (m³/m³)	0.13	0.29
Bulk density (Mg/m³)	1.33	1.35
Saturated conductivity (mm/hr)	6.9	0.8
Initial water (m³/m³)	0.22	0.31

Pasture	11 kg/superphosphate/ha/yr	45 kg/superphosphate/ha/yr	90-375 kg/superphosphate/ha/yr
Legume proportion fixed at	10%	20%	30%
Population	Annual Ryegrass	Annual Ryegrass	Perennial Ryegrass
Phenology	Senescent	Senescent	S. Dormant (0)
Live DM (kg/ha)	0	0	0
Standing dead DM (kg/ha)	1000	1000	1000
Litter DM (kg/ha)	200	200	200
Below ground DM (kg/ha)	0	0	1500
Max. rooting depth (mm)	400	400	500
Seed DM (kg/ha)	200	200	
Livestock			

Breed	Medium Merino
Standard reference weight	47 kg
Greasy fleece weight	5 kg
Fibre diameter	19 microns
Fleece yield	73 %
Death rate: adults	3 %/year
Death rate: weaners	3 %/year

Management policy: Wether management		
Stocking rate	VARIABLE	
Shearing date	30-Jun	
Replacement rule	Rule	Purchase wethers on 25 Nov at age 15 months, live weight 45 kg and C.S. 2.5
	Cast for age	Sell stock aged 6 to 7 years on 25 Nov

Maintenance Feeding	rule		
Main flock	thinnest animals	It animal condition falls to 1.5 during 1 Jan to 31 Dec feed to maintain weight of the thinnest animals If animal condition falls to 0.5 during 1 Jan to 31 Dec feed to maintain condition of the	
Weaner stock	Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan thinnest animals	to 31 Dec feed to maintain weight of the	
	Supplement:	Supplement: whole barley	
	Ingredient	Barley, whole	
	Proportion of mix (%)	100	
Supplement	Dry matter content (%)	89	
	Dry matter digestibility (%)	90	
	ME:DM (MJ/kg)	13.7	
	Crude protein (%)	12	
	Rumen-degradable protein (%)	85	

pplement	Dry matter content (%)	89
	Dry matter digestibility (%)	90
	ME:DM (MJ/kg)	13.7
	Crude protein (%)	12
	Rumen-degradable protein (%)	85
Pasture rule		

	_
Do not reset pasture	
Costs: Sheen costs -Merino	

Wether Shearing	\$6.00 /head		
Wether Husbandry	\$2.00 /head		
Wether Replacement	\$45.00 /head		
Sheep sales commission	5 %		
Sheep sales cost	\$2.00 /head		
Pasture costs	VARIABLE		
Supplement costs (Barley, whole)	\$320.00 /t		

Prices: Merino prices -general		
Wool prices for wethers	17 micron	1462 c/kg
	18 micron	1352 c/kg
	19 micron	1057 c/kg
	21 micron	893 c/kg
	Av. Fleece Price	85 %
	Wool commission	5 %
	Base price	185 c/kg
Wether sales	Dressing percentage	43 %
	Skin price	\$4.00 /head

Self-replacing Merino ewes at Hamilton

Property: Hamilton			
Number of paddocks	1	1	
Total area	100 ha]	
Weather: Hamilton (VIC) Weather station	[Hamilton (VIC)	1	
Data period	1 Jan 1966 to 31 Dec 2007		
Paddock: Fertilised paddock	•	•	
Area	100.0 ha Level		
Steepness Fertility	VARIABLE		
Reduce wind to	100%		
Soil: Brown duplex soil			
Soil albedo	0.17		
Soil evaporation	3.3 mm/d ^{1/5}	ı	
	Topsoil	Subsoil	
Cumulative depth (mm)	300 0.31	1000 0.42	
Field capacity (m³/m³) Wilting point (m³/m³)	0.13	0.29	
Bulk density (Mg/m³)	1.33	1.35	
Saturated conductivity (mm/hr)	6.9	0.8	
Initial water (m³/m³)	0.22	0.31	
Pasture	11 kg/superphosphate/ha/yr	45 kg/superphosphate/ha/yr	90-375 kg/superphosphate/ha/yr
Legume proportion fixed at	10%	20%	30%
Population	Annual Ryegrass	Annual Ryegrass	Perennial Ryegrass
Phenology	Senescent	Senescent	S. Dormant (0)
Live DM (kg/ha)	1000	0 1000	0 1000
Standing dead DM (kg/ha) Litter DM (kg/ha)	200	200	1000
Below ground DM (kg/ha)	0	0	1500
Max. rooting depth (mm)	400 200	400 200	500
Seed DM (kg/ha) Livestock	200	200	
Breed	Medium Merino		
Standard reference weight		kg	
Greasy fleece weight Fibre diameter		kg microns	
Fleece yield	70	%	
Ram breed	Medium Merino (Mature ram: 70.0 kg)	0//	
Death rate: adults Death rate: weaners		%/year %/year	
Management policy: Meriono ev			l
Stocking rate	VARIABLE		
Shearing date	25-Nov		
Replacement rule	Rule	Self-replacing each 1 Jan Sell stock aged 5 to 6 years on 31 Dec	
Reproduction rule	Cast for age	Sell Stock aged 5 to 6 years on 51 Dec	
First join at	1 years	1	
Birth date	13-Sep	1	
Conception at CS 3	(singles) 90%	1	
	(twins) 10%		
Weaning date	30-Nov		
One ram per	50 ewes		
Keep rams for	5.0 years		
Sell young stock	Sell 0 year old animals on 1 Feb	I	
Maintenance Feeding rule	Feed in paddock, applying the rules:		I
	If animal condition falls to 2.5 during 1 Jan to	31 Dec feed to maintain condition of	
Main flock	average animals If animal condition falls to 2.0 during 1 Jan to	31 Dec feed to maintain condition of the	
	thinnest animals	or boo look to maintain container or the	
Weaner stock	Feed in paddock, applying the rules: If animal condition falls to 1.0 during 1 Jan to	31 Dec feed to maintain condition of the	
	thinnest animals	or boo look to maintain container or the	
	Supplement:		
	Ingredient	Barley, whole	
	Proportion of mix (%)	100 89	
Supplement	Dry matter content (%) Dry matter digestibility (%)	90	
	ME:DM (MJ/kg)	13.7	
	Crude protein (%)	12 85	
Pasture rule	Rumen-degradable protein (%)	J 33	I
Do not reset pasture			
Costs: Sheep costs -Merino			1
Ewe Shearing Shearing Lambs		/head	
Ewe Husbandry	\$2.50	/head	
Lamb Husbandry		/head	
Ewe Replacement Rams	\$60.00 \$800.00		
Sheep sales commission	5	%	
Sheep sales cost		/head	
Pasture costs Supplement costs (Barley, whole)	VARIABLE \$320.00	/t	
Prices: Merino prices -general	\$320.00		I
	18 micron	1352	
Wool prices for ewes	19 micron 21 micron	1057	c/kg
	Av. Fleece Price	85	%
	Wool commission	5	%
Ewe sales	Base price Dressing percentage	175 45	c/kg %
	Skin price	\$3.00	/head
Lamb sales	Base price Dressing percentage	300	c/kg %

Crossbred ewes at Hamilton

Barrell Hamilton			
Property: Hamilton Number of paddocks	11	I	
Total area	100 ha		
Weather: Hamilton (VIC)			
Weather station Data period	Hamilton (VIC) 11 Jan 1966 to 31 Dec 2007		
Paddock: Fertilised paddock		1	
Area	100.0 ha		
Steepness Fertility	Level VARIABLE		
Reduce wind to	100%		
Soil: Brown duplex soil			
Soil albedo	0.17		
Soil evaporation	3.3 mm/d ^½	l	
	Topsoil	Subsoil	1
Cumulative depth (mm)	300	1000	
Field capacity (m³/m³)	0.31	0.42 0.29	
Wilting point (m³/m³) Bulk density (Mg/m³)	1.33	1.35	
Saturated conductivity (mm/hr)	6.9	0.8	
Initial water (m³/m³)	0.22	0.31	
Pasture	11 kg/superphosphate/ha/yr	45 kg/superphosphate/ha/yr	90-375 kg/superphosphate/ha/yr
Legume proportion fixed at	10%	20%	30%
Population	Annual Ryegrass	Annual Ryegrass	Perennial Ryegrass
Phenology	Senescent	Senescent	S. Dormant (0)
Live DM (kg/ha)	0	0	0
Standing dead DM (kg/ha) Litter DM (kg/ha)	1000	1000 200	1000 200
Below ground DM (kg/ha)	0	0	1500
Max. rooting depth (mm)	400	400	500
Seed DM (kg/ha) Livestock	200	200	<u> </u>
Breed	Border Leicester x Merino		1
Standard reference weight	60	kg	1
Greasy fleece weight		kg microns	
Fibre diameter Fleece yield	68		
Ram breed	Dorset (Mature ram: 110.0 kg)		
Death rate: adults		%/year %/year	
Death rate: weaners Management policy: XB ewe ma		76/ year	ı
Stocking rate	VARIABLE		1
Shearing date	25-Nov		
Replacement rule	Rule	Self-replacing each 1 Jan	
	Cast for age	Sell stock aged 5 to 6 years on 31 Dec	l
Reproduction rule	Id	ı	
First join at Birth date	1 years 13-Sep		
Conception at CS 3	(singles) 49%		
Conception at 00 5	(twins) 45%		
Weaning date	30-Nov		
One ram per	100 ewes		
Keep rams for	4.0 years		
Sell young stock	Sell 0 year old animals on 1 Feb		
Maintenance Feeding rule			1
	Feed in paddock, applying the rules: If animal condition falls to 2.5 during 1 Jan to	31 Dec feed to maintain weight of	
Main flock	average animals	•	
	If animal condition falls to 2.0 during 1 Jan to thinnest animals	31 Dec feed to maintain condition of the	
	Feed in paddock, applying the rules:		
Weaner stock	If animal condition falls to 2.0 during 1 Jan to	31 Dec feed to maintain weight of the	
weaner stock	If animal condition falls to 1.5 during 1 Jan to	31 Dec feed to maintain condition of the	
	thinnest animals		
	Supplement: v		
	Ingredient	Barley, whole	
Supplement	Proportion of mix (%) Dry matter content (%)	100 89	
Supplement	Dry matter digestibility (%)	90	
	ME:DM (MJ/kg)	13.7	
	Crude protein (%)	12 85	
Pasture rule	Rumen-degradable protein (%)	35	ı
Do not reset pasture]		
Costs			1
Ewe Shearing		/head /head	
Shearing Lambs Ewe Husbandry		/head	
Lamb Husbandry		/head	1
Ewe Replacement	\$60.00 \$800.00		
Rams Sheep sales commission	5	%	
Sheep sales cost	\$2.00	/head	1
Pasture costs Supplement costs (Parloy whole)	VARIABLE \$320.00	/!	
Supplement costs (Barley, whole) Prices	g320.00	**	ı
1 11000	21 micron		c/kg
Wool prices for ewes	25 micron		c/kg
	30 micron Av. Fleece Price		c/kg %
	Wool commission	5	%
	Base price	175	c/kg
Ewe sales	Dressing percentage Skin price		% /head
	Base price	320	c/kg
Lamb sales	Dressing percentage		%

Interpolating a medium fertility level for Hamilton

We derived a model relating annual pasture production to fertiliser application rate at Hamilton using data published by Quigley *et al.* (2003) (Table 1, Fig. 6). The equation applied was:

$$P = a + \frac{b}{1 + e^{(-(F-c)/d)}}$$

where P is annual pasture production (kg.ha⁻¹.yr⁻¹), F is the fertiliser application rate (kg single superphosphate.ha⁻¹.yr⁻¹), and the relevant constants are: a = 5733.5 (kg.ha⁻¹.yr⁻¹), b = 6920.8 (kg.ha⁻¹.yr⁻¹), c = 89.880, and d = 24.608.

Table 1. Data from Quigley *et al.* (2003) for mean annual pasture production at different fertiliser application rates, modelled data for the same fertiliser application rates, and the relevant GrassGro fertility scalar applied for each fertiliser application rate.

Fertiliser applied	Mean annual pasture production	Modelled annual pasture production	GrassGro
(kg superphosphate/ha/yr)	(kg/ha) (Quigley et al. 2003)	(kg/ha)	fertility scalar
11	6000	6003	0.43
45	6700	6695	0.47
90	9200	9202	0.62
130		11521	0.78
170	12400	12397	0.84
260	12700	12647	0.86
375	12600	12654	0.86

We used the fitted model to derive a value for annual pasture production at a fertiliser application rate of 130 kg superphosphate.ha⁻¹.yr⁻¹ (Table 1, Fig. 6). The relevant GrassGro fertility scalar value for each fertiliser application rate (Table 1.) was set by matching the simulated pasture production in GrassGro with measured pasture production data (or the modelled value for the 130 kg superphosphate.ha⁻¹.yr⁻¹ application rate).

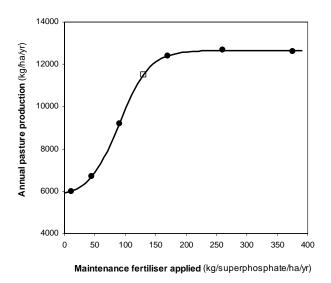


Figure 6. The relationship between annual pasture production and fertiliser application rate for Hamilton. Data from Quigley *et al.* (2003) are black circles, the line depicts the fitted model, and the square shows the interpolated pasture production value for a fertiliser application rate of 130 kg superphosphate.ha⁻¹.yr⁻¹.