

Grading-up to a self-shedding flock to reduce farm costs



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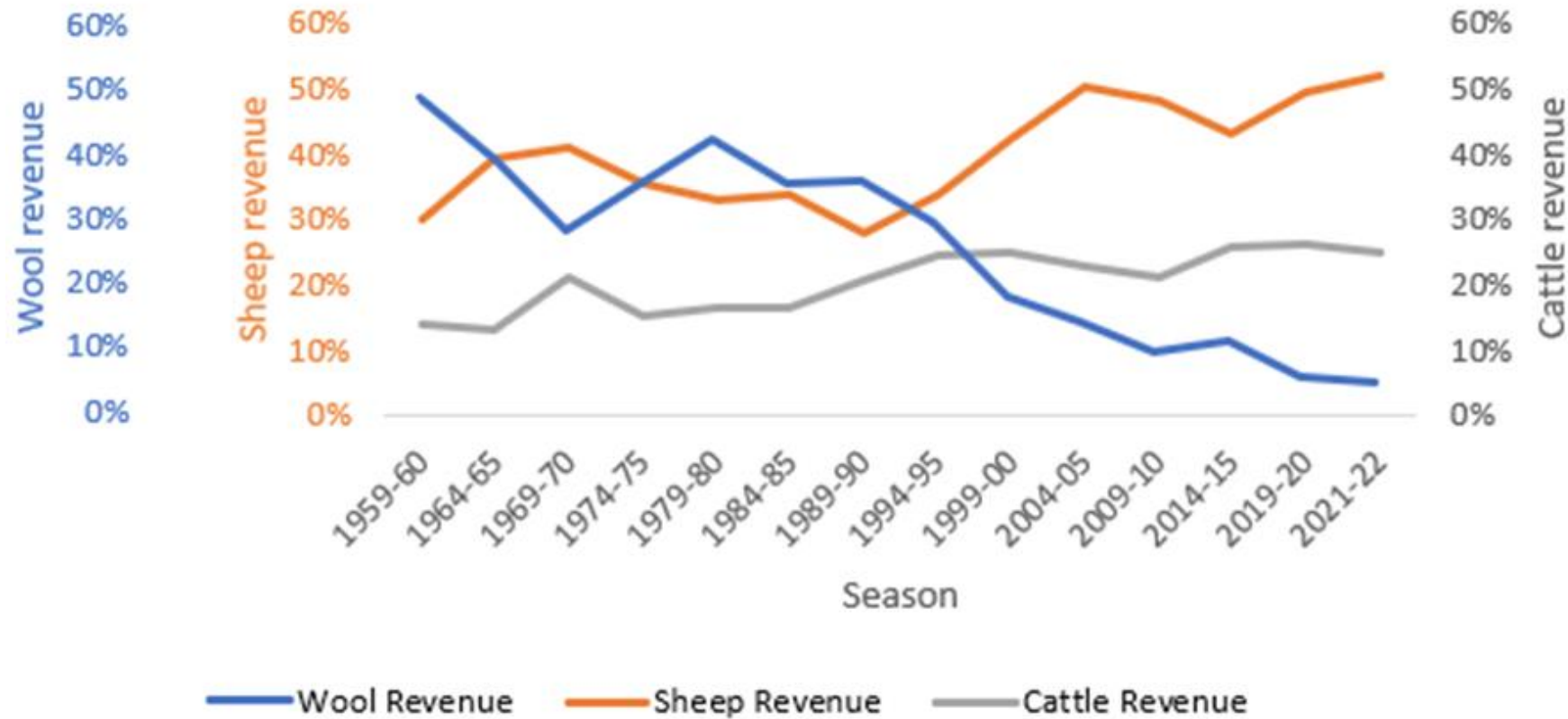


Current sheep farm income

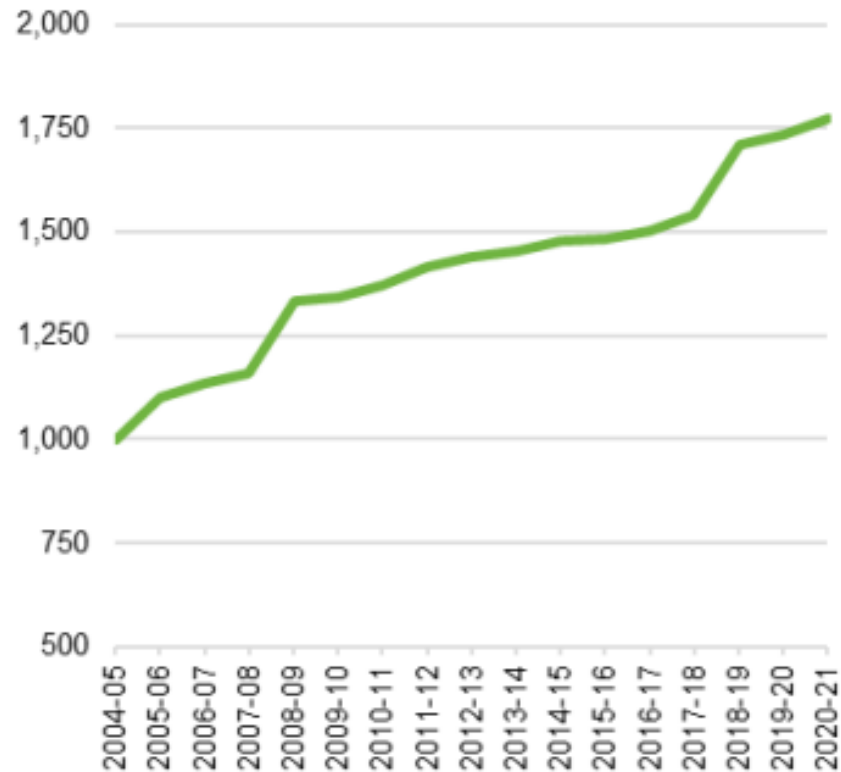
Farm type	Income %					
	1989/1990		2016/2017		2019/2020	
	Wool	Sheep	Wool	Sheep	Wool	Sheep
S.I High Country	71	15	28	40	24	47
S.I. Hill Country	50	29	13	58	8	63
N.I. Hard Hill Country	42	23	6	58	5	57
N.I. Hill Country	34	23	5	45	3	46
N.I. Intensive Finishing	28	24	3	33	2	32
S.I Finishing Breeding	40	36	6	58	3	54
S.I. Intensive Finishing	39	45	7	72	4	74
S.I. Mixed Finishing	14	15	1	8	0.5	10

The income from wool as a percentage of total farm income has dropped while the income derived from lamb has increased

Revenue source all NZ sheep and beef farms



Cumulative Shearing costs increases from 2004/05 to 2020/21 by 76% (2004-05 = 1000)




The way we handle wool has not changed over the years



Bio-economic modelling of a East Coast NI Hill Country sheep and beef farm

- Grading up transition to a fully shedding flock of $^{15}/_{16}$ Wiltshire and $^1/_{16}$ Romney
- it took 12 – 15 years of crossbreeding to achieve a fully shedding third or fourth cross flock

Modelling a Transition from Purebred Romney to Fully Shedding Wiltshire–Romney Crossbred

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The Wiltshire option

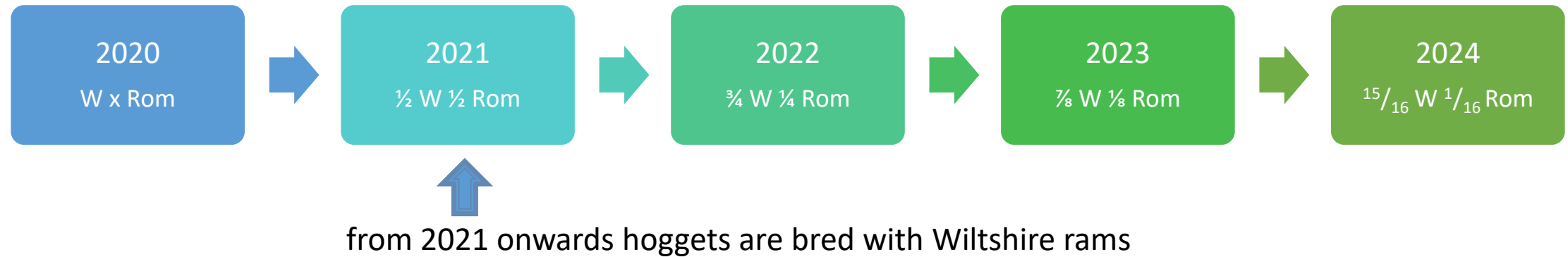
- net present value of transition flock after 15 years was 7% higher than base Romney flock at \$2.15/kg greasy wool price
- needed a breakeven greasy wool price in this sensitivity analysis of **\$4.15 /kg**
- current clean price for 34 -40 Micron approximately \$2.90 (\approx 2.20 GFP)

The Wiltshire Experiment – MU Riverside farm

The model was limited by lack of accurate recent data on:

- production levels of various crossbreds (a lot of old data and gaps)
- costs incurred with the grading up process
- proportion that shed at each backcross
- other impacts such as animal health and welfare
- value of unblemished skins from no shearing

Riverside Farm – grade up Romney type sheep to fully shedding Wiltshire



Litter size, survival, birth weight and growth to weaning of Romney and ½ Wiltshire x ½ Romney lambs in 2020 (average of males and females)

	Romney	½ Wiltshire x ½ Romney
Litter size (born to mature ewes)	1.8	1.7
Survival to Docking	84.2	87.0
Birth Weight (kg)	5.3	5.3
Day 30 Weight (kg) 1 October	14.7	14.6
Weaning weight (kg) 26 November	28.5	28.9
Growth birth to weaning (grams/day)	255	262

Liveweight and growth from weaning to mating for ewe lambs

	Romney	½ Wiltshire x ½ Romney
Weight 26 Nov (kg) 2020	27.4	27.7
Weight 21 Jan (kg)	35.7	36.3
Weight 17 Feb (kg)	35.0	37.1
Weight 10 Mar (kg)	39.4	41.6
Weight 13 April (kg)	43.2	44.9
Weight 30 April (kg) 2021	44.3	46.4
Growth Weaning- Mating (grams/day)	99	119

Liveweight and growth from ewe lamb mating to two tooth lambing

Event	Romney	½ Wiltshire ½ Rom
Ram out 30 April 2021	44.3	46.4
PD 3 rd August	48.3	49.2
Set stock 15 th September	55.0	56.4
Docking 9 th November	55.2	57.1
Weaning 17 th December	57.2	59.2
February 2 nd 2022	61.1	65.7
Two tooth Mating 1 April	64.1	69.4
Docking 10 October	64.9	71.3

Breeding of ½ Romney ½ Wiltshire cross ewe lambs to Wiltshire rams in late April 2021 and as two teeths 2022

- no difference liveweights at mating between ½ Wiltshire ½ Romney and Romney ewe lambs or as two teeths
- no difference in incidence of oestrus prior to breeding (ie onset of puberty in hoggets)
- no difference in fertility or fecundity between ½ Wiltshire ½ Romney and Romney ewe lambs or two teeths

Litter size, survival, birth weight and growth to weaning of $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney lambs (2021) born to hoggets

	Romney	$\frac{3}{4}$ Wiltshire x $\frac{1}{4}$ Romney
Litter size (born to hoggets)	1.14	1.20
Weaning %	81.3	100.9
Survival to weaning	74.3	87.7
Birth Weight (kg)	4.3	4.4
Day 30 Weight (kg) 9 Nov	14.6	14.7
Weaning weight (kg) 17 Dec	23.7	24.6
Growth birth to wean (gms/d)	260	272

Litter size, survival, birth weight and growth to docking of $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney lambs (2022) born to two-tooths

	Romney	$\frac{3}{4}$ Wiltshire x $\frac{1}{4}$ Romney
Litter size (Scanning percentage)	1.82	1.90
Survival to docking	85.6	90.8
Birth Weight (kg)	4.6	4.7
Lamb Vigour score	2.5	2.8
Day 33 docking wgt 10 October	14.0	15.1
Growth birth to docking (gms/d)	277	304

Liveweight and growth from weaning to lambing for $\frac{3}{4}$ Wiltshire and $\frac{1}{4}$ Romney ewe lambs

	Romney	$\frac{3}{4}$ Wilt $\frac{1}{4}$ Romney
Weight 17 December (kg) 2021	24.5	25.1
Weight 26 January (kg) 2022	31.8	32.9
Weight 9 March (kg)	36.7	37.5
Weight 29 April (kg)	44.6	44.3
Growth Weaning- Mating (gm/d)	177	167
Weight 2 June (kg)	51.4	48.6
Weight 20 July 2022 (kg)	52.9	49.6
Scanning percentage 22 July	1.13	1.04
Set Stock Weight	63.2	60.7

Breeding of $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney cross ewe lambs to Wiltshire rams in April 2022

- no difference liveweights at mating between $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney and Romney ewe lambs
- no difference in incidence of oestrus prior to breeding (ie onset of puberty in hoggets)
- no difference in fertility or fecundity between $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney and Romney ewe lambs

Shedding score

Method of scoring shedding

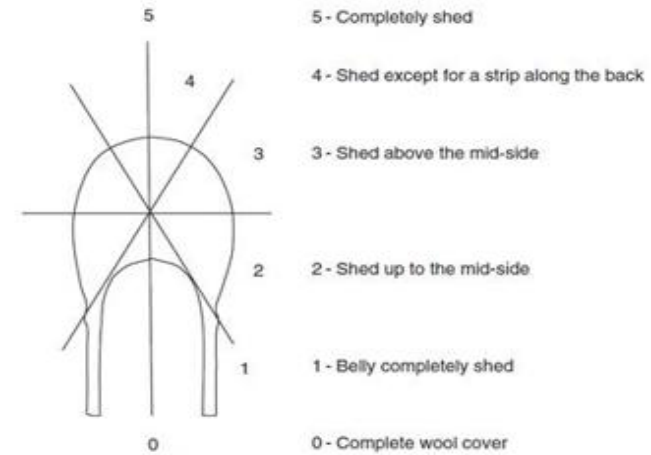





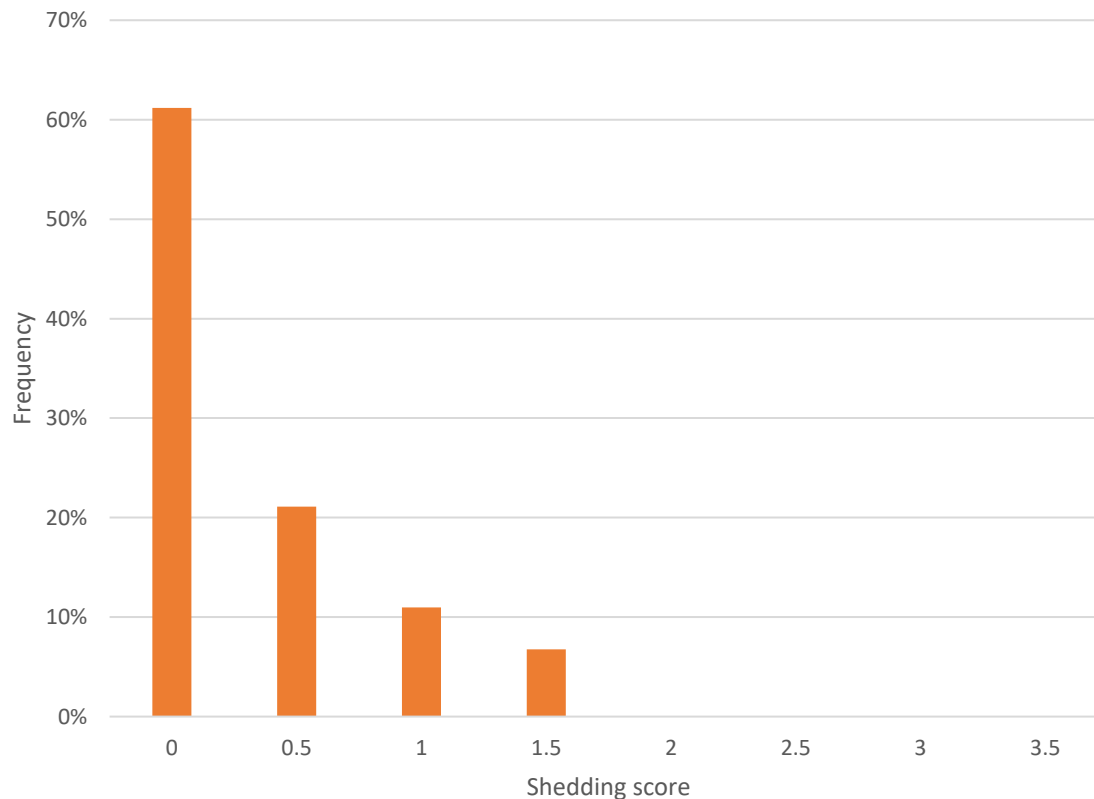


Fig. 1. Diagrammatic representation of shedding scores for Wiltshire sheep.

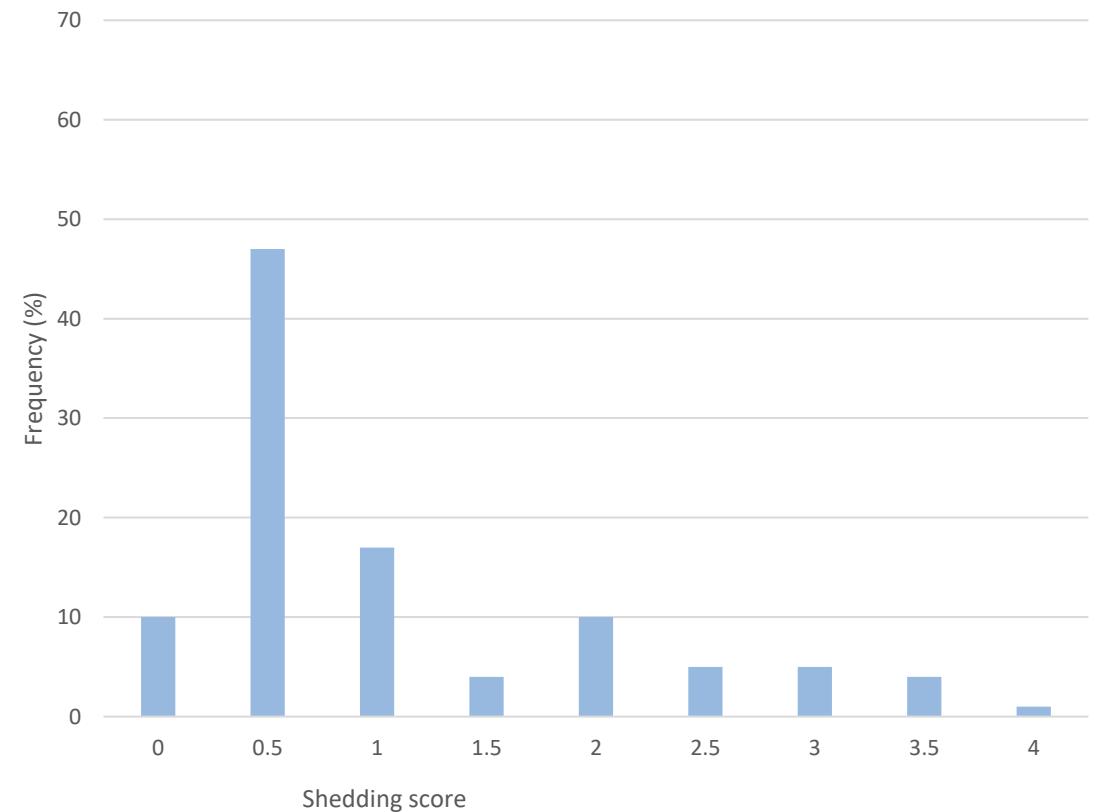
<p>Score 1 Wool over all the main wool growing area</p> 	<p>Score 2 Wool shed from ¼ of the wool growing area</p> 	<p>Score 3 Wool shed from 50% of the wool growing area</p> 	<p>Score 4 Wool shed from ¾ of the wool growing area</p> 	<p>Score 5 Wool shed from all wool growing areas</p> 
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Shedding score for lambs (4-5 months old) – note late January/early February better than at weaning

Lamb shedding $\frac{1}{2}$ Wiltshire $\frac{1}{2}$ Romney score 21 Jan 2021



Lamb Shedding $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney score 21 Jan 2022



Examples of shedding ½ Wiltshire ½ Romney lambs at 5 months of age on 21 January 2021



score 0.5

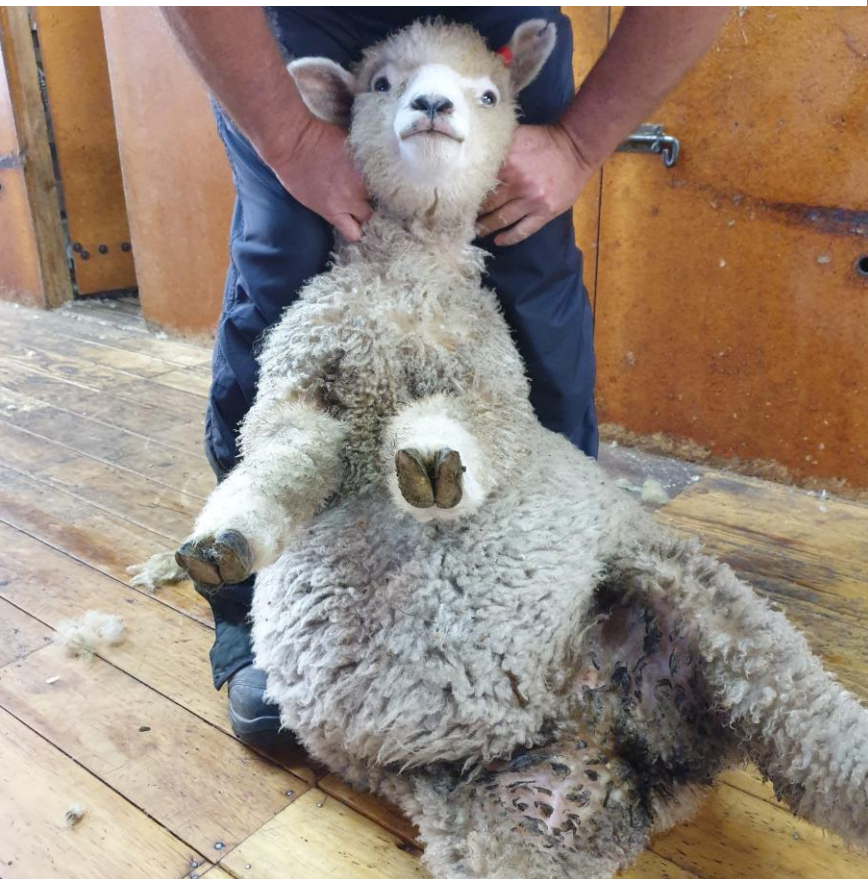


score 0.5



score 1.0

Shedding score of Romney and $\frac{3}{4}$ Wiltshire x $\frac{1}{4}$ Romney lambs at 5 months of age 2022



Romney score 0.0



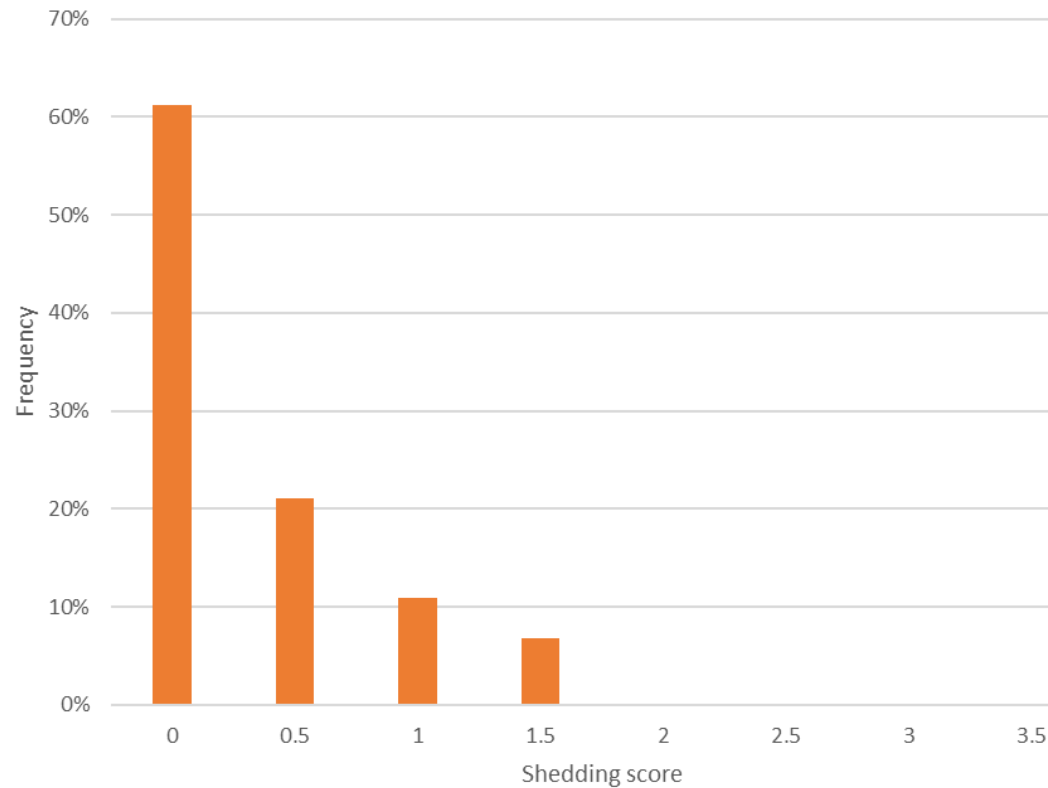
Score 2.5



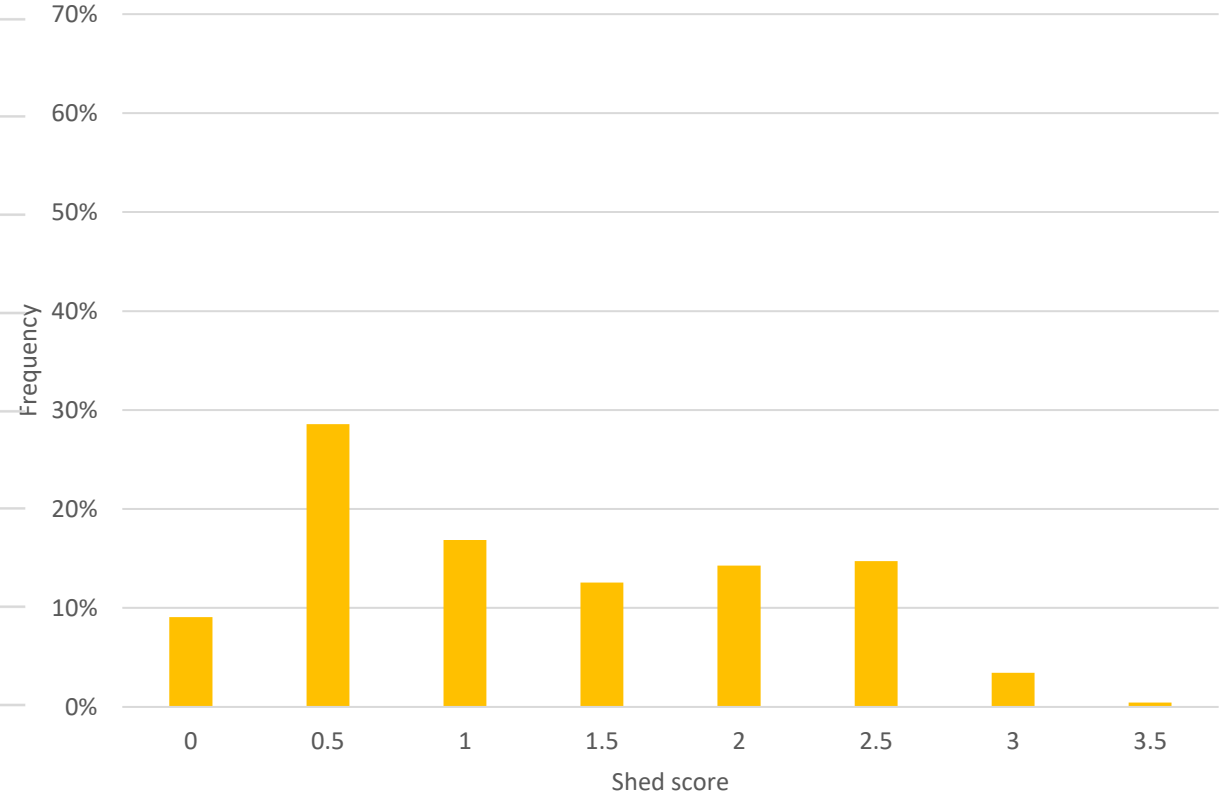
Score 3.0

Shedding score for ½ Wiltshire ½ Romney (2/2/2022) at either 5 or 17 months of age

Lamb shedding ½ Wiltshire ½ Romney score 21 Jan 2021



½ Wiltshire ½ Romney two tooth tooth's shedding score 2 Feb 2022



Shedding score for ½ Wiltshire ½ Romney at 17 months of age



shed score 1.5



shed score 2.5



shed score 3.5

Fleece weight and some wool traits measured

	Romney	½ Wiltshire x ½ Romney
Fleece weight at lamb Shearing 10 th February 2021 (kg)	1.97	1.75
Mean Fibre Diameter (microns) at lamb shearing	29.9	29.3
Clean Yield (%) at lamb Shearing	79.2	80.9
Fleece weight 2 tooth shearing 15 th March 2022 (kg)	3.2	2.1
Mean Fibre Diameter	39.6	38.3
Clean Yield (%)	86.9	84.3

Wool traits measured at lamb and hogget shearing

	Romney	$\frac{3}{4}$ Wiltshire x $\frac{1}{4}$ Romney
Fleece weights (kg) 22 Feb 2022	1.35	0.68
Mean Fibre Diameter (microns)	30.3	30.0
Clean Yield (%)	86.7	83.9
Length (mm)	70.6	57.6
Ffleece Wgt (kg) 2 September 2022	2.56	0.94

Conclusions to date

- to date little difference in live weights
- reproductive performance was not lower in Wiltshire crosses (some evidence of increased lamb survival)
- our data shows the need to wait to late January to do shedding score in lambs
 - increased shedding in $\frac{3}{4}$ cross as expected
- less wool ie 0.2 kg in $\frac{1}{2}$ Wiltshire and 0.7 kg in $\frac{3}{4}$ Wiltshire at lamb shearing
- and 1.2 kg in 2 tooth shearing in $\frac{1}{2}$ Wiltshire's and 1.6 kg inat hogget shearing in $\frac{3}{4}$ Wiltshire's

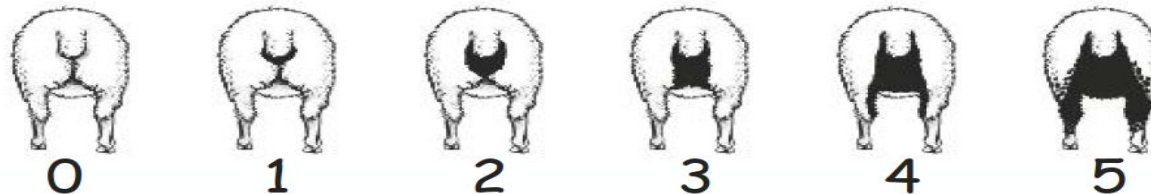
Acknowledgements

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- Farm Staff at Riverside
- Technical Animal Science team at Massey University

Dag score on 1-5 scale

Date measured	Romney	½ Wiltshire x ½ Romney
5 months old (Jan)	0.97	0.84
15 Month Weaning	1.7	1.4
18 Months	0.7	0.6

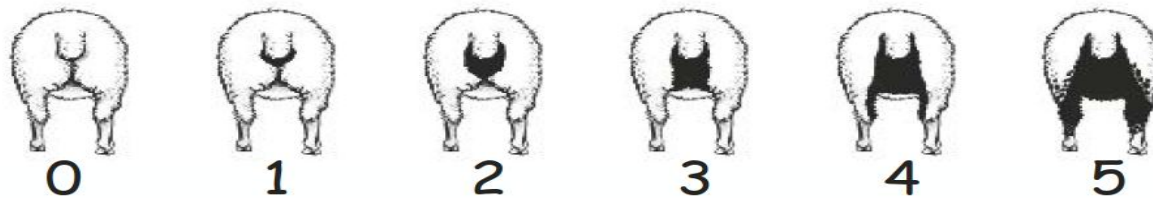
SIL Dag Score Scale



Dag score on 1-5 scale

Date measured	Romney	$\frac{3}{4}$ Wiltshire x $\frac{1}{4}$ Romney
5 months old (Jan)	0.4	0.3

SIL Dag Score Scale



Internal parasites

- Aim is to monitor parasite burden in the comparable age groups
 - FEC - no difference between the $\frac{1}{2}$ Wiltshire $\frac{1}{2}$ Romney vs the Romney at approximately 80 days of age
 - FEC - no difference between the $\frac{1}{2}$ Wiltshire $\frac{1}{2}$ Romney vs the Romney at approximately 6 months of age
 - FEC - no difference at weaning of their lambs (in December i.e. at 14 months of age) between the $\frac{1}{2}$ Wiltshire $\frac{1}{2}$ Romney and the Romney
- FEC - no difference between $\frac{3}{4}$ Wiltshire $\frac{1}{4}$ Romney and Romney lambs at approximately 80 days of age

Future measurements

- Examine feet score at two tooth stage and in subsequent age groups
 - no differences to date
- Examine teeth as they age
- Mothering ability score
 - no difference to date
 - hogget lambing of ½ Wiltshire 1/2 Romney and Romney hoggets in October 2021
- Pelt quality
- Meat quality
- The genes involved