

Effect of ewe prolificacy & stocking rate on lamb growth, production efficiency & carcass output

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Introduction

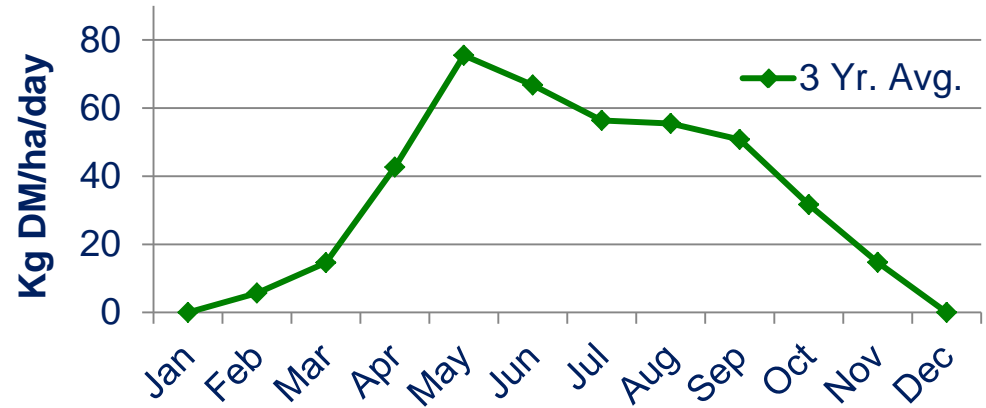
❖ Industry

- ❑ 35 254 flocks
- ❑ 7.4 ewes/ha
- ❑ 1.3 lambs weaned/ewe
- ❑ 189 kg carcass/ha

❖ Grass-based lamb production systems

❖ Grass dry matter (DM) production 8 to 11 t DM/ha

Annual grass growth curve

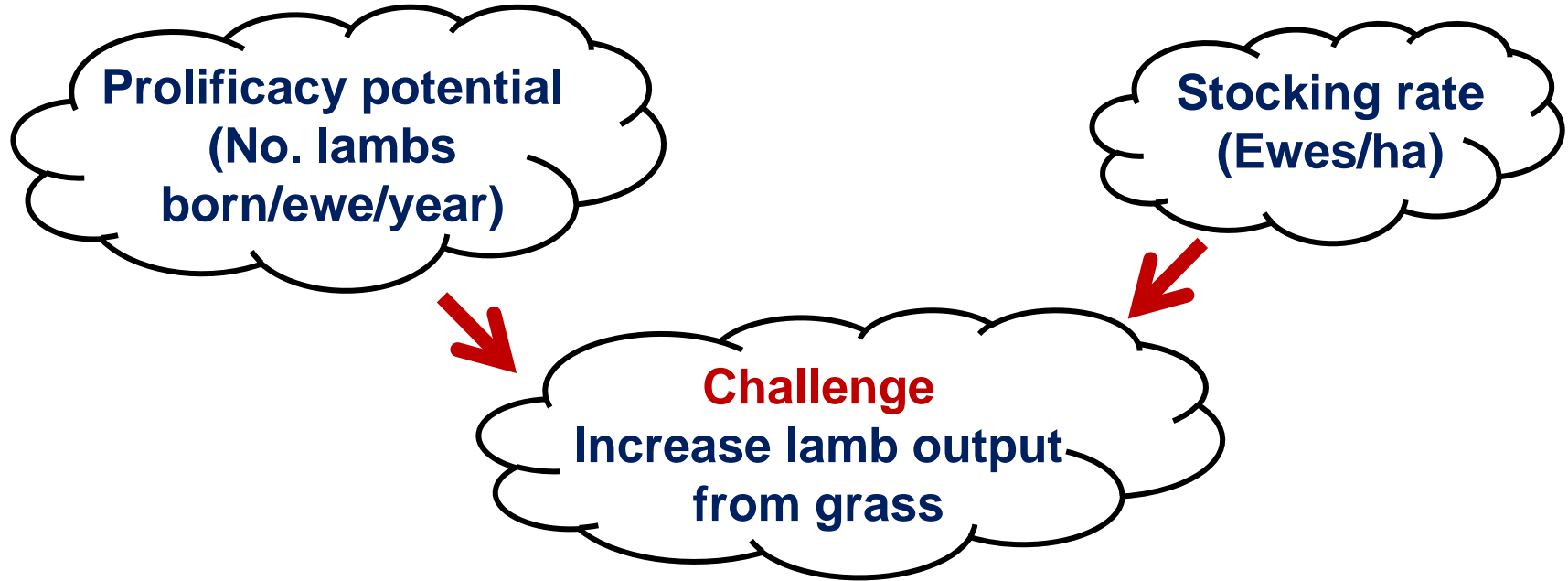


Value of Grass

- ❖ 90-95% of annual energy requirements of sheep
- ❖ Grazed Grass
 - ❑ 18% Crude protein
 - ❑ 11 MJ ME/kg DM
- ❖ 1 t DM of ryegrass = €76 (£65) (Finneran et al. 2012)
- ❖ Competitive advantage
 - ❑ Ability to produce lamb from almost entirely **grass-based** diet
- ❖ Key to system → Sheep grazing 'high quality' grass to achieve high levels of performance and output



Factors influencing lamb production



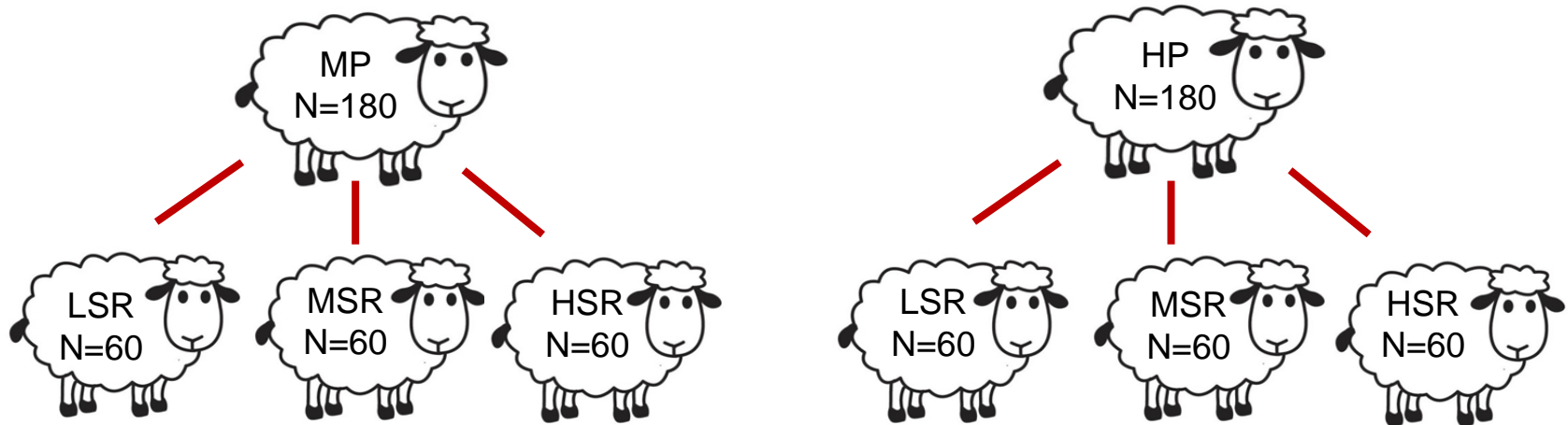
Objective

- ❖ To investigate the effect of Prolificacy potential (PP), stocking rate (SR) & their interaction in a **grass-based** production system on:
 - ❑ Lamb performance
 - ❑ Production efficiency
 - ❑ Carcass output



Experimental design

- ❖ Established in October 2012 (3 production years)
- ❖ 2 x 3 factorial design



MP = Medium prolificacy (1.5 lambs/ewe), HP = High prolificacy (1.8 lambs/ewe)
LSR= 10 ewes/ha, MSR= 12 ewes/ha, HSR = 14 ewes/ha

Materials & methods

- ❖ Ewes were mated in October/November to lamb early March
- ❖ Ewes were housed on average:
 - ❑ Early December (HSR), Late December (MSR) & Mid-January (LSR)
- ❖ Offered baled grass silage *ad libitum*
- ❖ Concentrate supplementation introduced in late pregnancy
- ❖ Post lambing: Ewes & lambs were turned out to pasture
- ❖ Grazing decision rules:

	LSR	MSR	HSR
Target pre graze herbage mass (kg DM/ha)	1200-1400	1200-1400	1200-1400
Target post graze sward height (cm) pre-weaning	4.5	4.1	3.7
Target post graze sward height (cm) post-weaning	5.5 (Lambs) 4.5 (Ewes)	5.1 (Lambs) 4.1 (Ewes)	4.7 (Lambs) 3.7 (Ewes)

Materials & Methods (cont.)

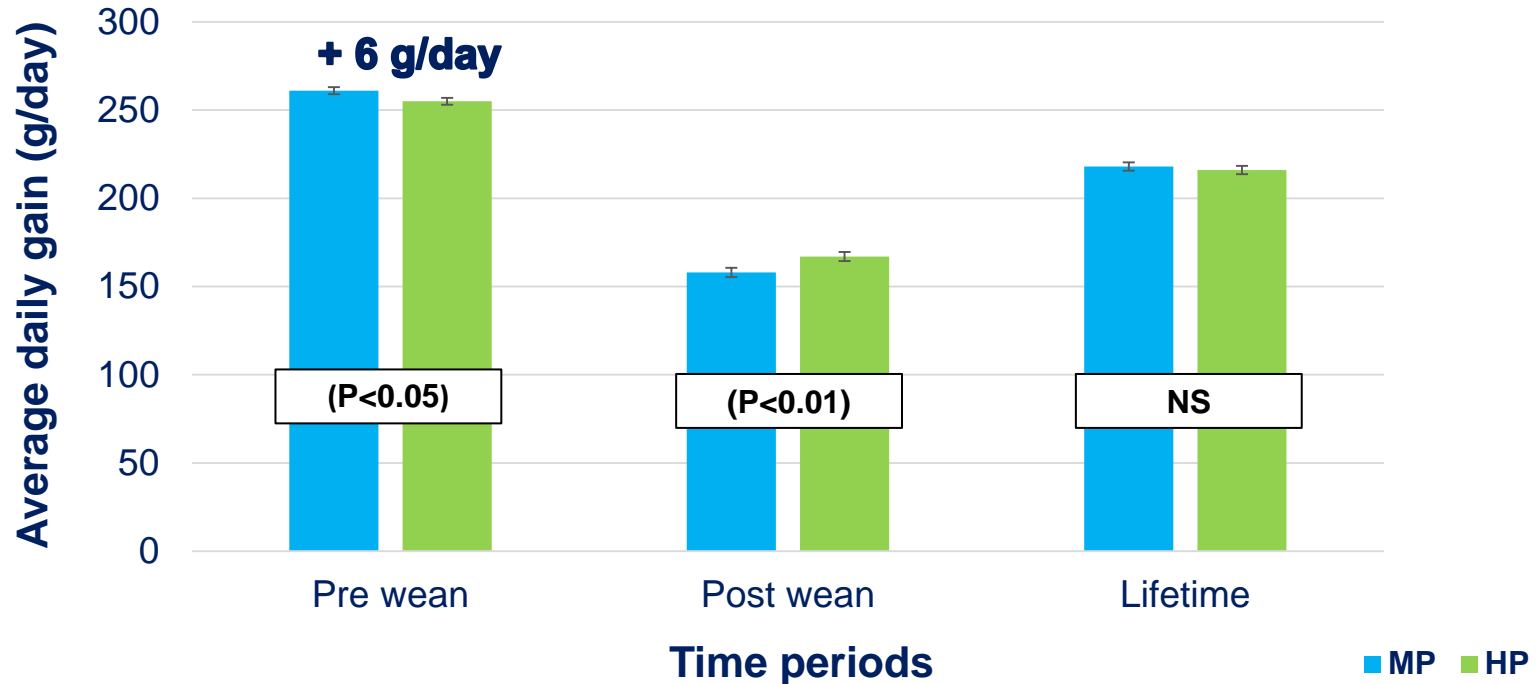
- ❖ Lamb growth rates were recorded from birth to slaughter
- ❖ All Lambs weaned on average at 14 weeks of age
- ❖ Lambs were drafted for slaughter
- ❖ Data analysed using PROC HP MIXED (SAS, 2012)
 - ❑ Main effects: PP, SR & their Interaction, Parity, Year
 - ❑ Ewe ID included as a random effect

Month	Live weight (kg)
June	42
Target carcass weight 20 kg	
August	44
September	45
October	46

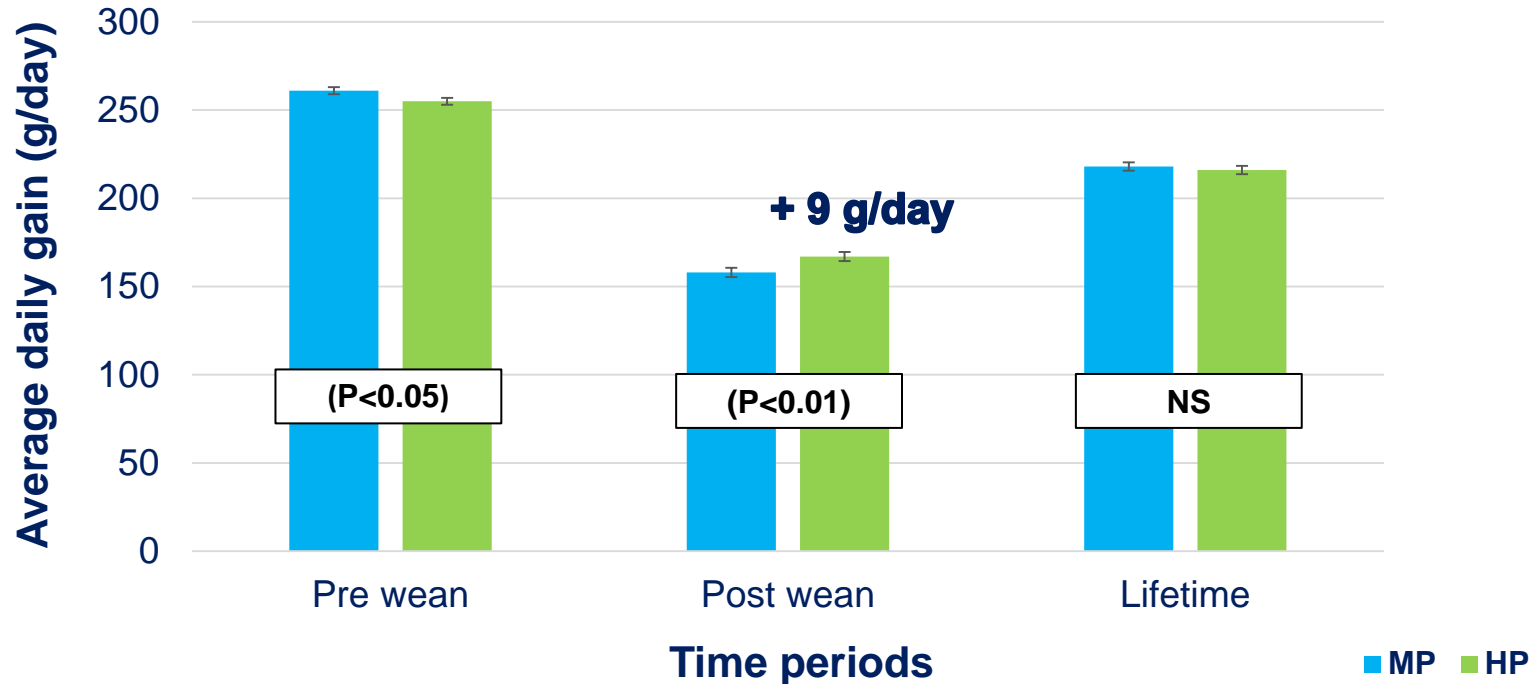
Results



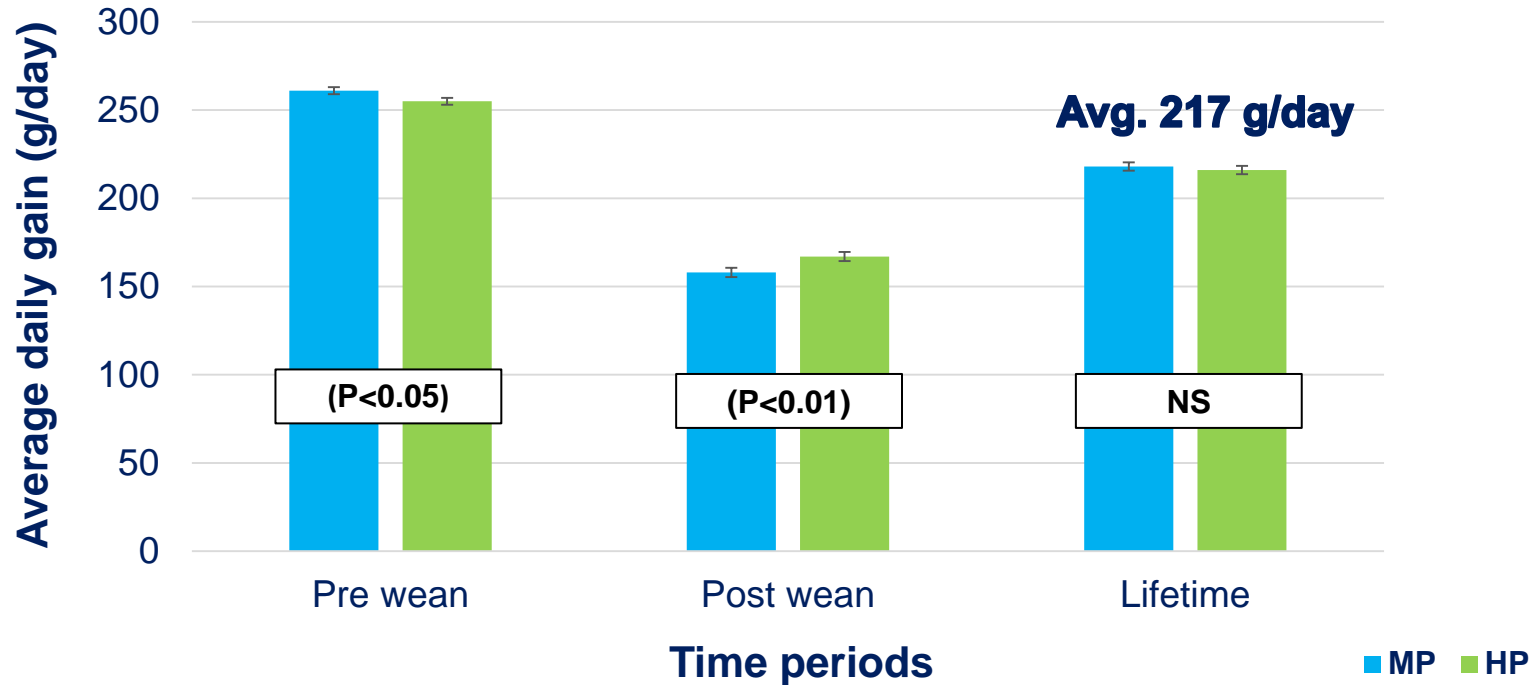
Effect of PP on lamb performance



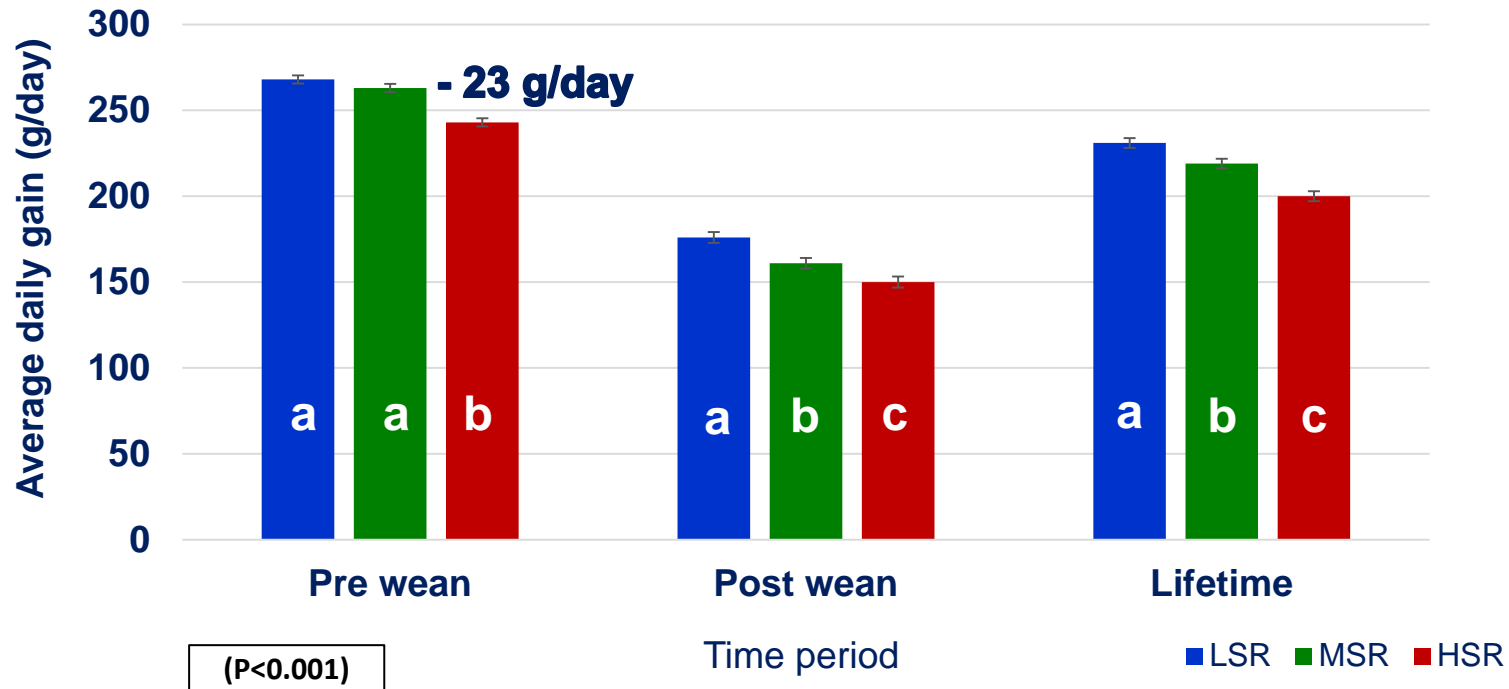
Effect of PP on lamb performance



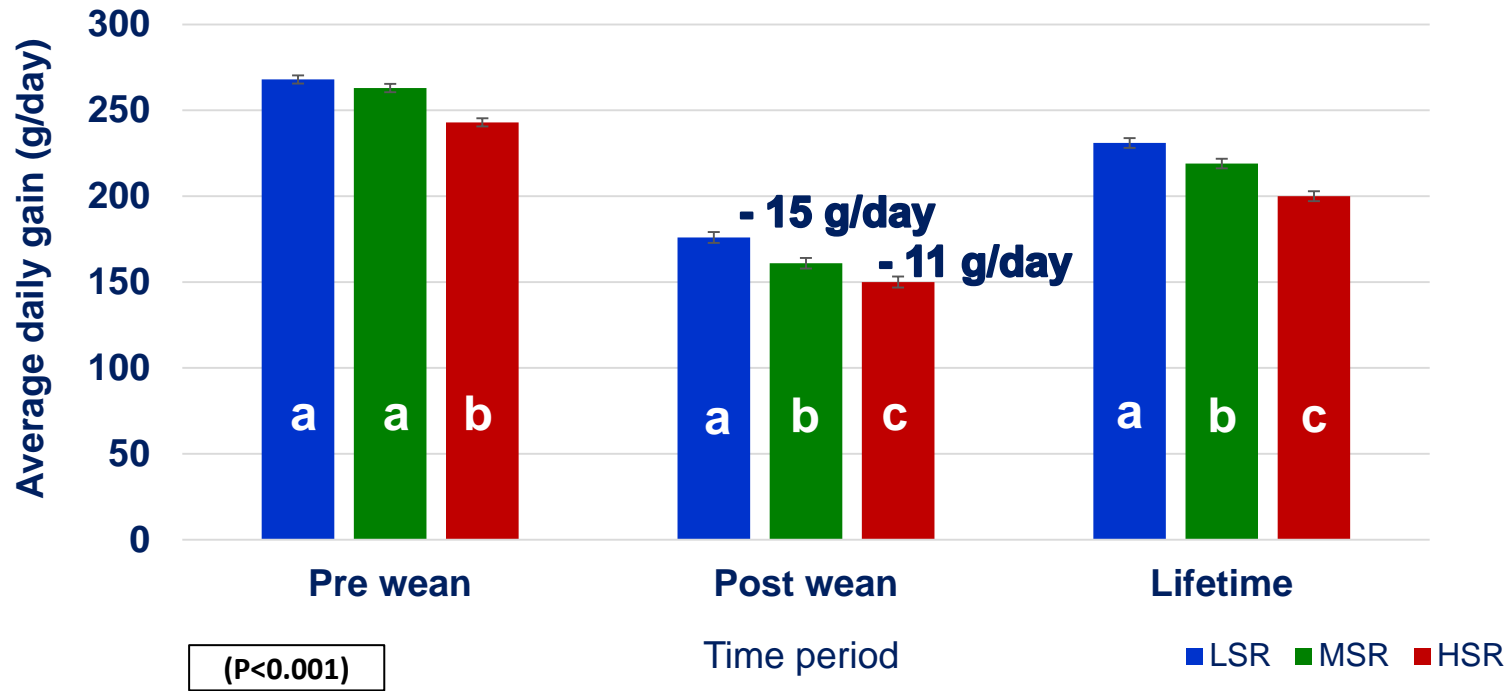
Effect of PP on lamb performance



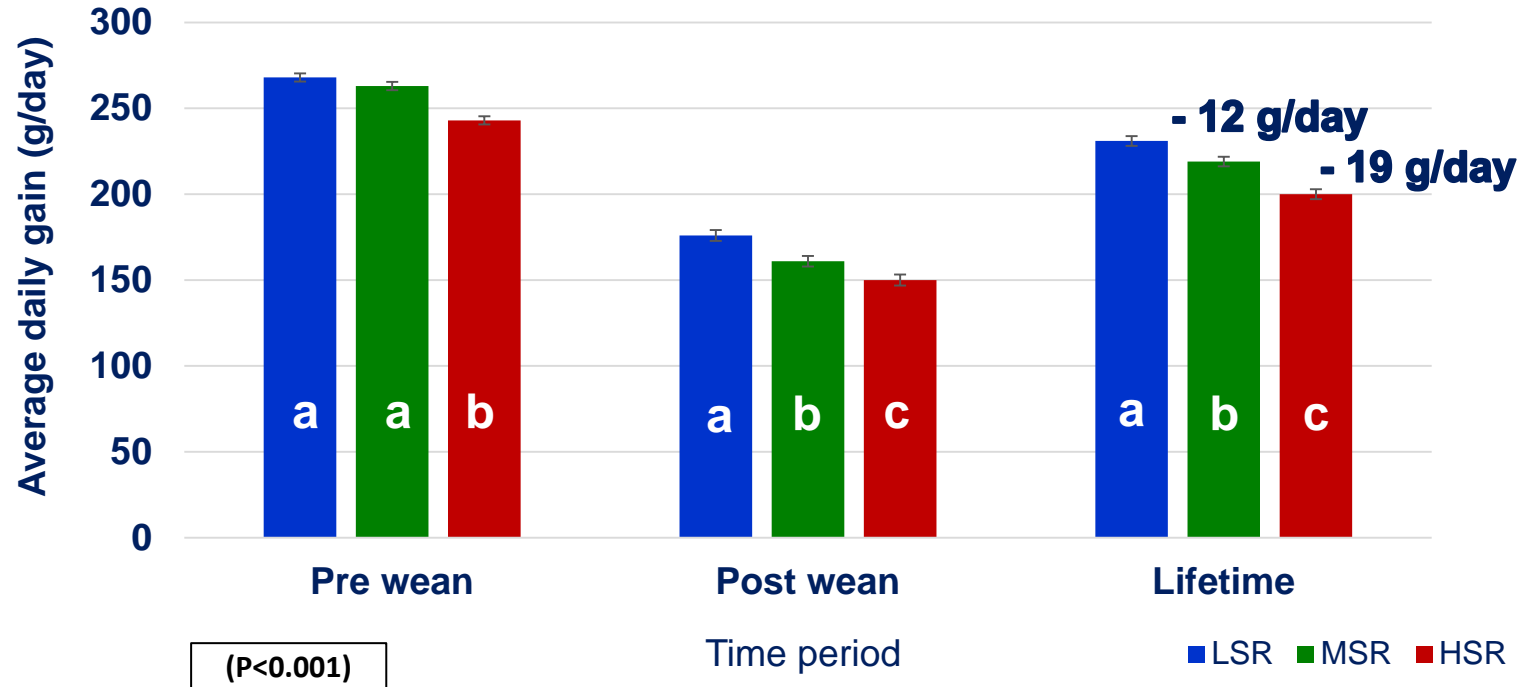
Effect of SR on lamb performance



Effect of SR on lamb performance



Effect of SR on lamb performance



Effect of PP & SR on carcass traits

Parameter	PP			SR				<i>P-value</i>	
	MP	HP	S.E.M	LSR	MSR	HSR	S.E.M	PP	SR
Carcass wt. (kg)	19.6	20.0	0.06	19.9 ^a	19.8 ^{ab}	19.7 ^b	0.06	***	*
Carcass grade	3.0	3.0	0.02	3.1 ^a	3.0 ^{ab}	3.0 ^b	0.02	NS	*
Carcass fat	2.8	2.9	0.02	2.8	2.8	2.8	0.03	***	NS
Kill out prop.	0.43	0.44	0.001	0.44	0.44	0.44	0.005	***	NS

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Measures of production efficiency



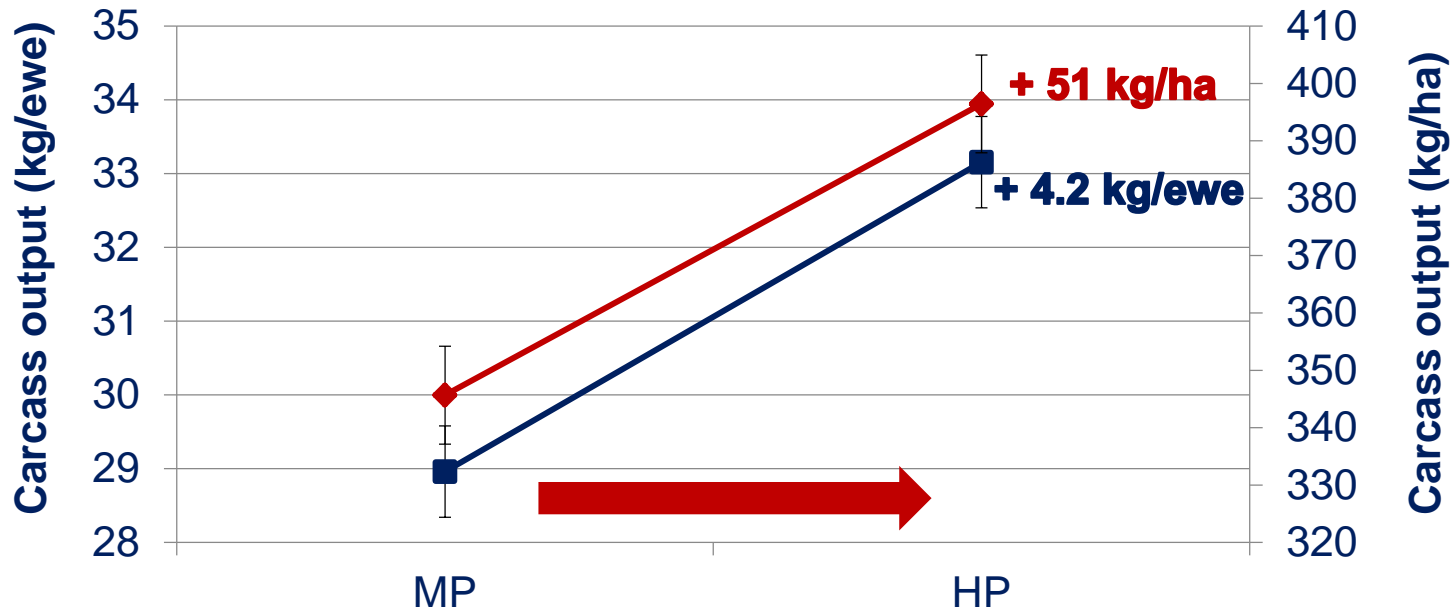
❖ Effect of PP:

Parameter	MP	HP	Difference %	<i>P-value</i>
No. lambs born/ewe	1.87	2.07	+11	***
No. lambs weaned/ewe	1.50	1.68	+12	**
Production efficiency‡/ewe	0.65	0.70	+5	*
Production efficiency‡/ha	0.76	0.86	+10	*

‡ = ratio of lamb live weight (kg) weaned to ewe live weight (kg) mated

❖ No effect of SR

Effect of PP on carcass output



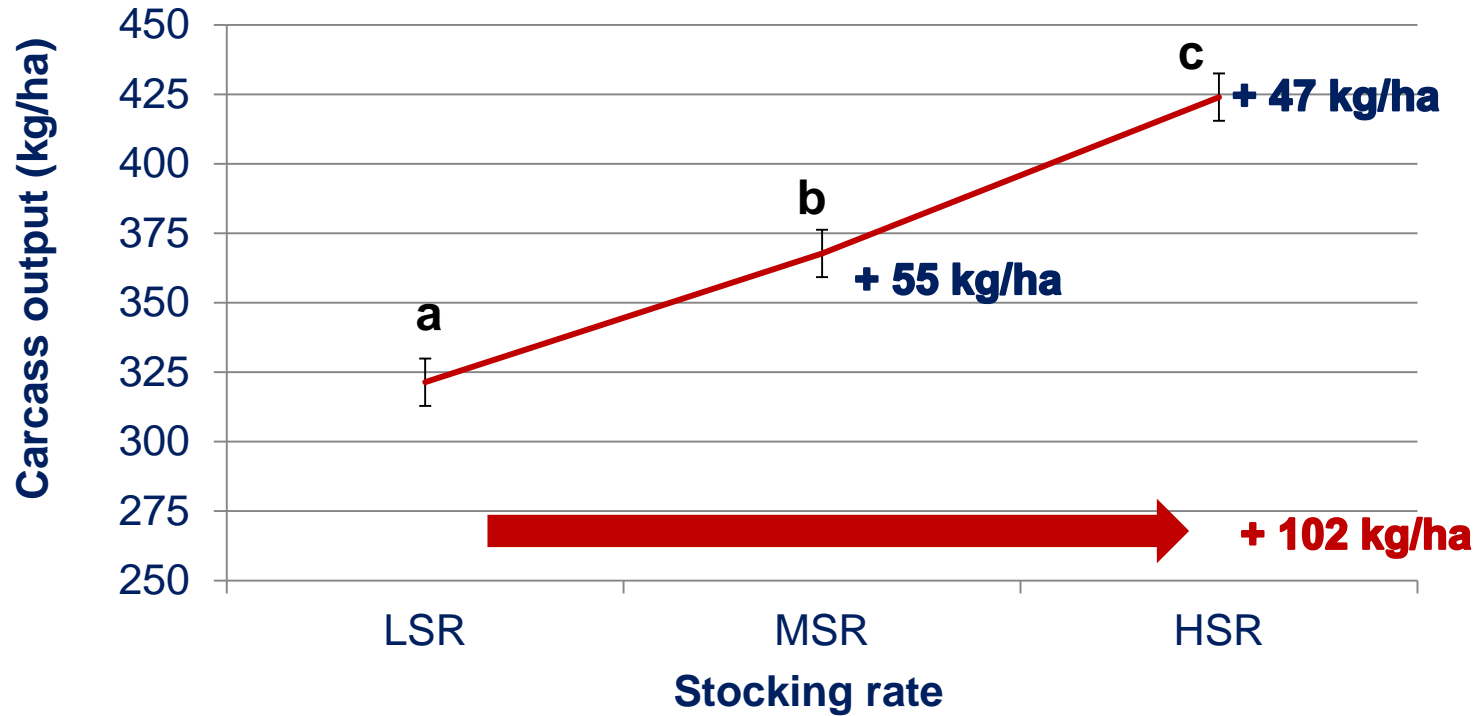
(P<0.001)

- Carcass output/ewe
- ◆ Carcass output/ha

Prolificacy

(P<0.01)

Effect of SR on carcass output



Effect of PP and SR on grass utilisation

Parameter	PP			SR				<i>P-value</i>		
	MP	HP	S.E.M	LSR	MSR	HSR	S.E.M	PP	SR	Inter.
Kilograms of grass DM utilised										
Hectare	10 449	10 347	247.0	8 306 ^a	10 038 ^b	12 849 ^c	302.1	NS	***	NS
Ewe and lamb unit	865	860	18.6	831 ^a	836 ^a	921 ^b	22.8	NS	*	NS
Kilogram of carcass produced	27.9	27.7	0.60	25.8 ^a	27.3 ^a	30.3 ^b	0.75	NS	*	NS

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Conclusion

- ❖ Increasing ewe PP increased production efficiency and carcass output without any negative effect on lifetime lamb performance
- ❖ Increasing SR increased carcass output despite reductions in lamb growth
- ❖ No effect of PP on the quantity of grass DM utilised
- ❖ The highest SR system required a greater quantity of grass DM



Thank you for your attention Any Questions?

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Tara Meeke and Cecile Valadier

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