



## The effect of pasture allowance on the performance of growing dairy heifers

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## Introduction

- Heifer rearing contributes a significant cost to dairying systems (Boulton, *et al.*, 2015)
- Consistently achieving target weights for 24 month calving is critical (McNaughton & Lopdell, 2013)
- Grazed grass is an ideal option to supply a high protein and low fat diet to the growing heifer (Boulton, *et al.*, 2013)
- Grazed grass remains the cheapest source of high quality feed in ruminant livestock systems (Shalloo, *et al.*, 2004)

## Introduction

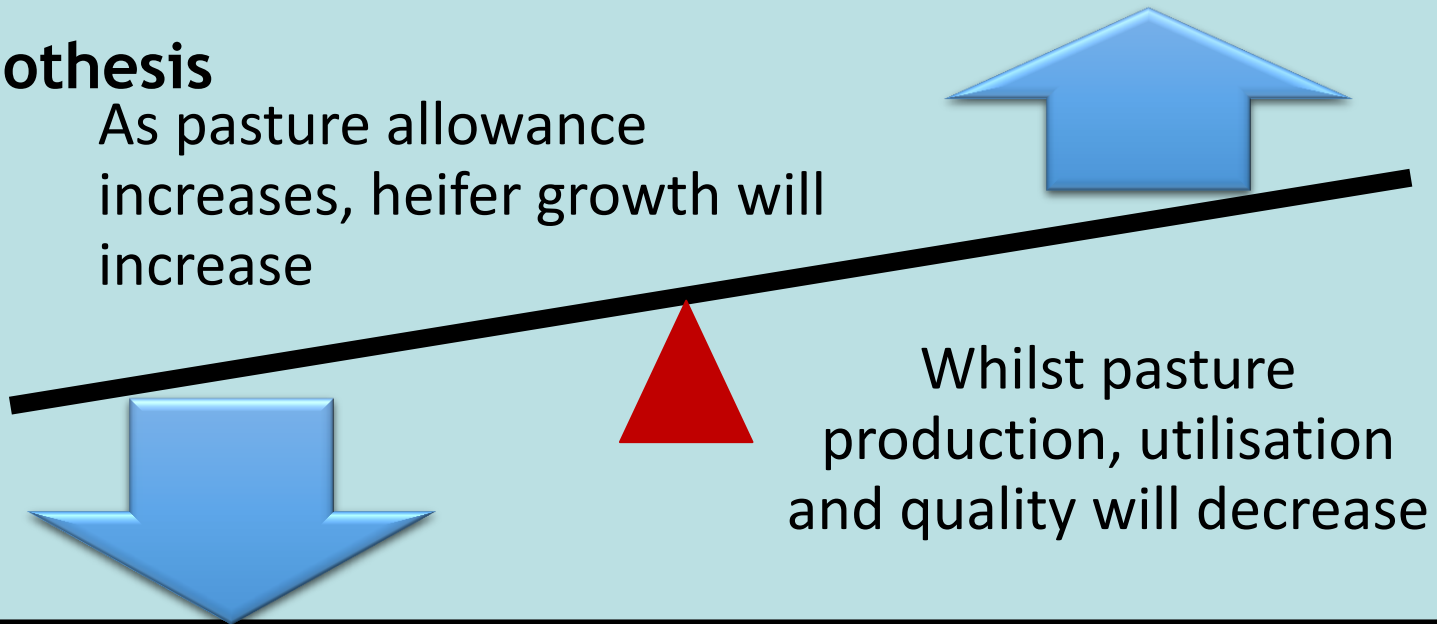
- Pasture allowance is well recognised for its effect on **herbage intake**, **pasture utilisation** and **nutritional value** of sward in subsequent rotations (Combellas and Hodgson, 1979)
- Extensive research carried out on pasture allowances for dairy cows (reviewed by, Pérez-Prieto and Delagarde, 2013)
- Limited research has investigated factors that influence the performance of modern high PLI Holstein heifers during grazing
- Industry guidelines for pasture allowance vary from 2.0% to 3.0% of body weight for growing cattle (AHDB, 2016)

**Objective** - Investigate the optimum pasture allowance for replacement dairy heifers in their first grazing season, to achieve optimal animal growth, pasture production and grass utilisation



## Hypothesis

As pasture allowance increases, heifer growth will increase



## Materials and Methods

- Heifers groups balanced on age and weight
- 3 replicates per treatment with 8 animals per grazing group - in total 24 animals per treatment and 72 animals overall
- 159 grazing days (6<sup>th</sup> April–11<sup>th</sup> Sept 2017)
- Heifer live weight and body condition scoring fortnightly
- 14 day grazing rotation at peak growth (May-June), extending to 24.5 day grazing rotation thereafter
- Compressed sward heights were recorded pre and post grazing of each paddock

## Materials and Methods

- Daily DM intakes based on pre and post grazing sward yield assessments
- Grass quality samples taken weekly, WSC, CP, ADF and ME were determined via near infrared spectrometry (0.2 m<sup>2</sup> at estimated grazing height)
- The data were analysed using GenStat (VSN International, 2015)
- Data gathered at multiple time points on individual heifers were analysed using repeated measures analysis
- Main effects of pasture allowance, time and their interaction were assessed, taking account of the random effects of paddock and the time intervals observed



Figure 1. Drone Footage of paddock perimeters used to set pasture allowances at 1.8, 2.4 and 3% of live weight in kg DM/day



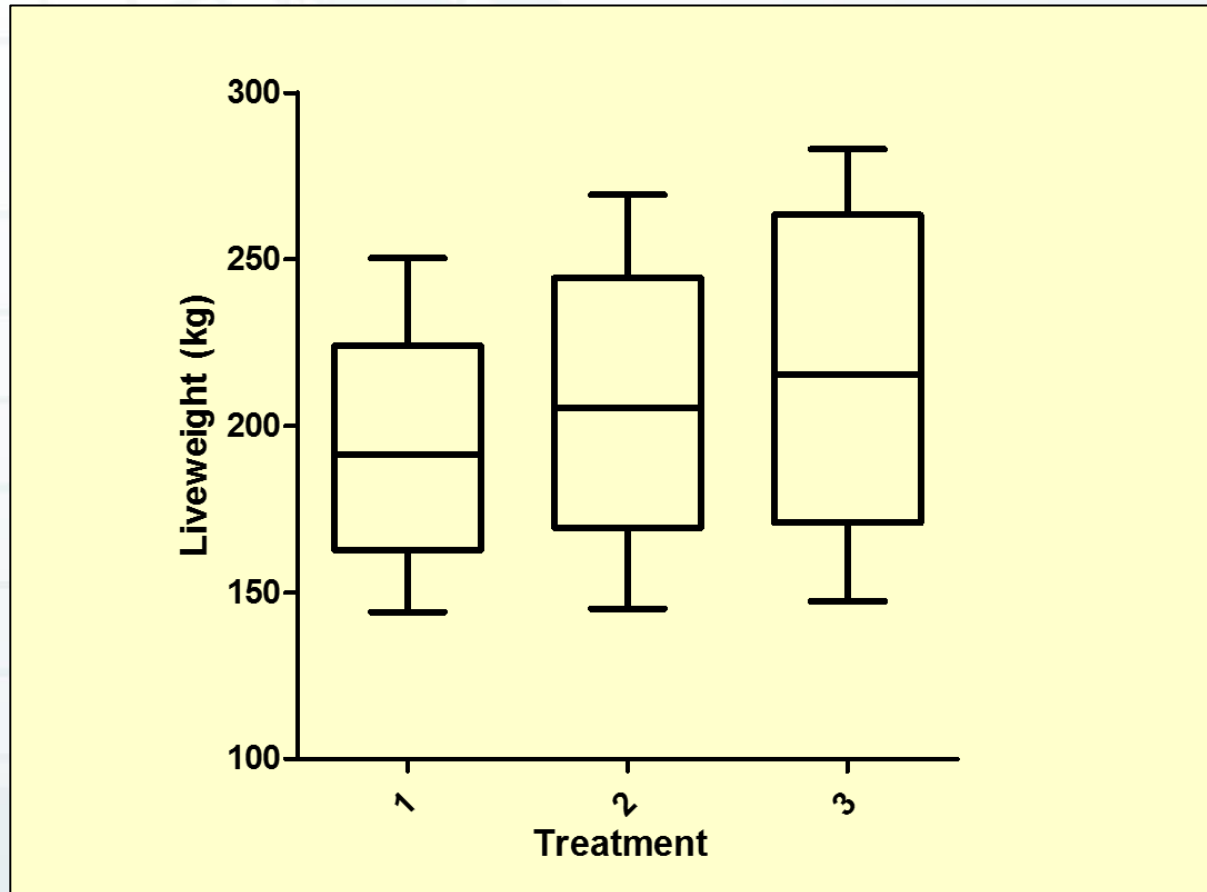
# Results



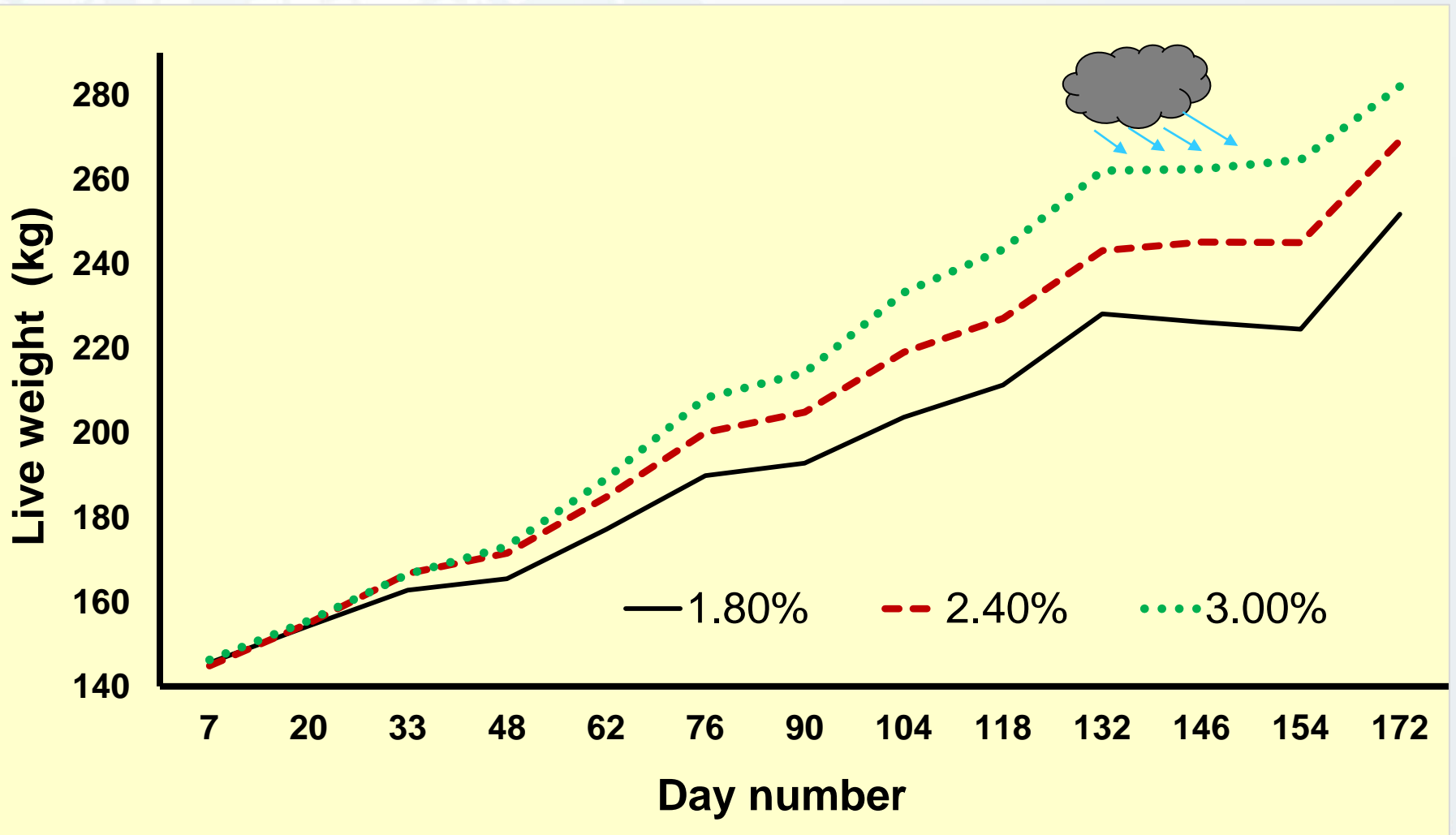
**Table 1. Effect of pasture allowance on animal performance**

	Grazing Allowance						Sig.
	1.80%	SEM	2.40%	SEM	3.00%	SEM	
Live weight (kg)	194.9	9.08	205.9	10.9	215.5	12.8	P<0.001
Body Condition Score	2.62	0.03	2.68	0.03	2.75	0.04	NS
Grass Intake (kg DM)	2.76	0.09	3.32	0.12	3.98	0.17	P<0.001

**Figure 1. Live weight of heifers across treatments**



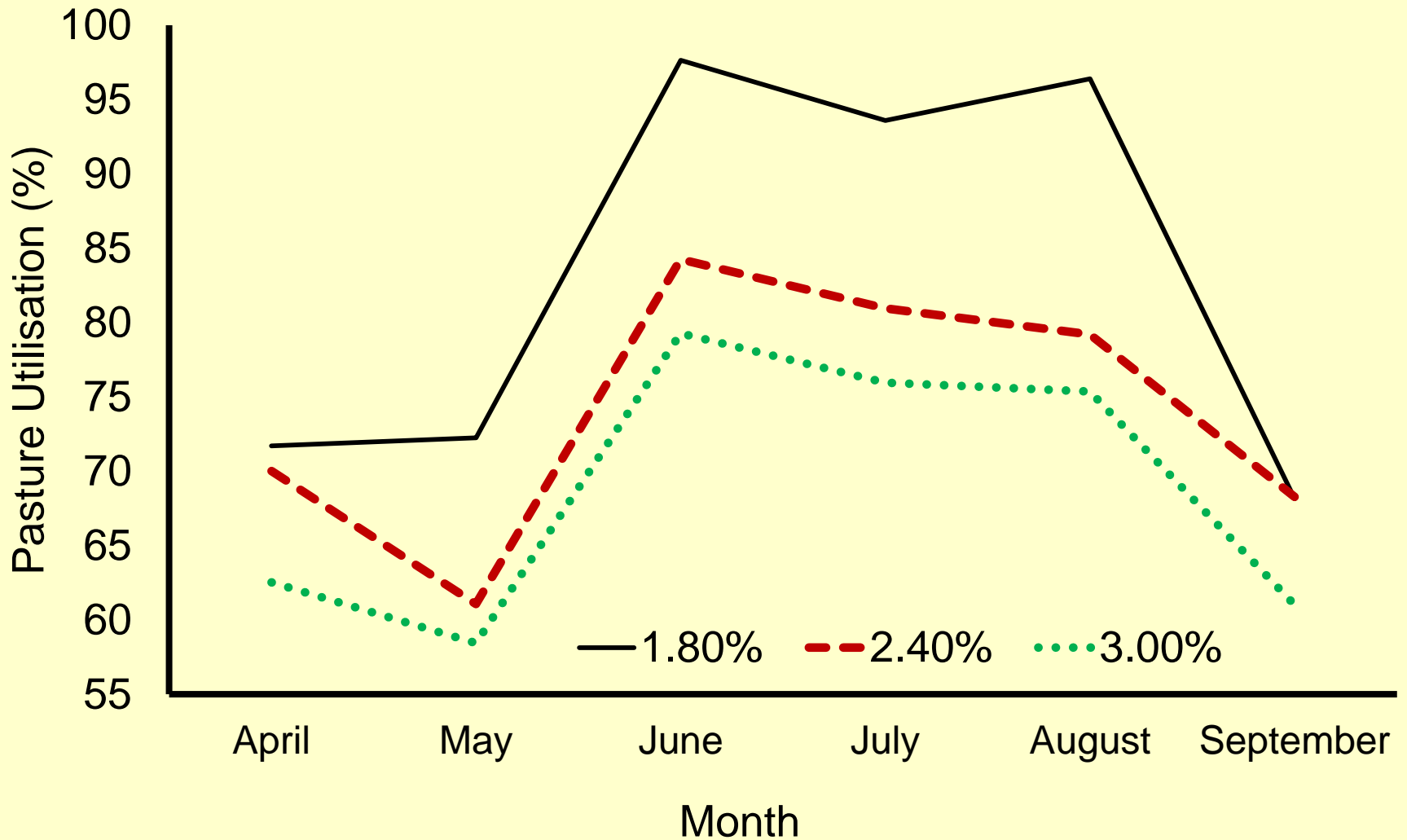
**Figure 2. Effect of pasture allowance on heifer live weight growth across the season**



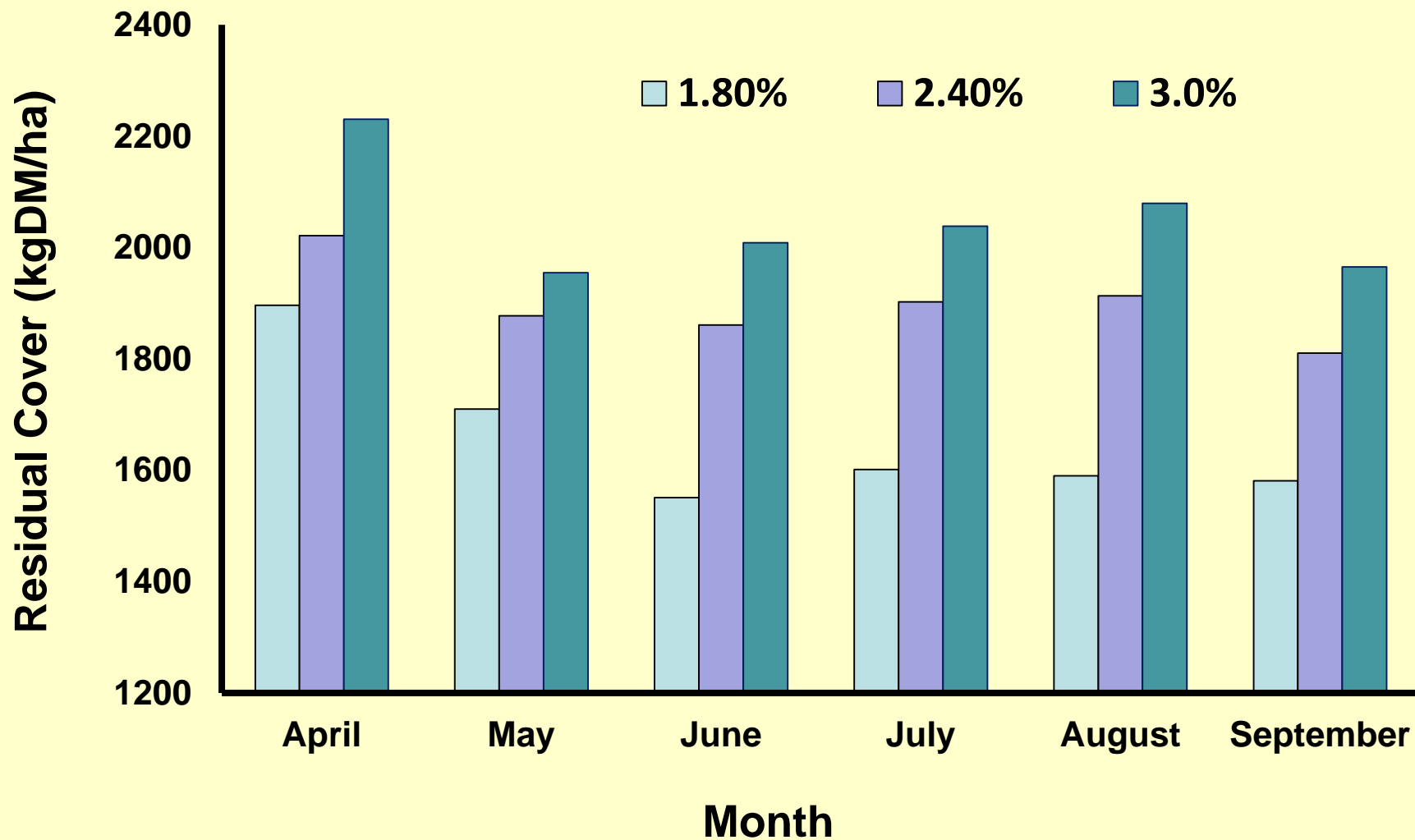
**Table 2. Effect of pasture allowance on pasture performance**

	Grazing Allowance						Sig.
	1.80%	SEM	2.40%	SEM	3.00%	SEM	
Grass utilisation (%)	81.5	2.42	72.4	1.80	67.3	1.83	P<0.001
Pre grazing cover (kg/DM/ha)	3125	105.0	3359	99.6	3510	97.0	NS
Grass yield (tDM/ha)	11.17	99.24	11.74	95.59	12.22	101.77	NS

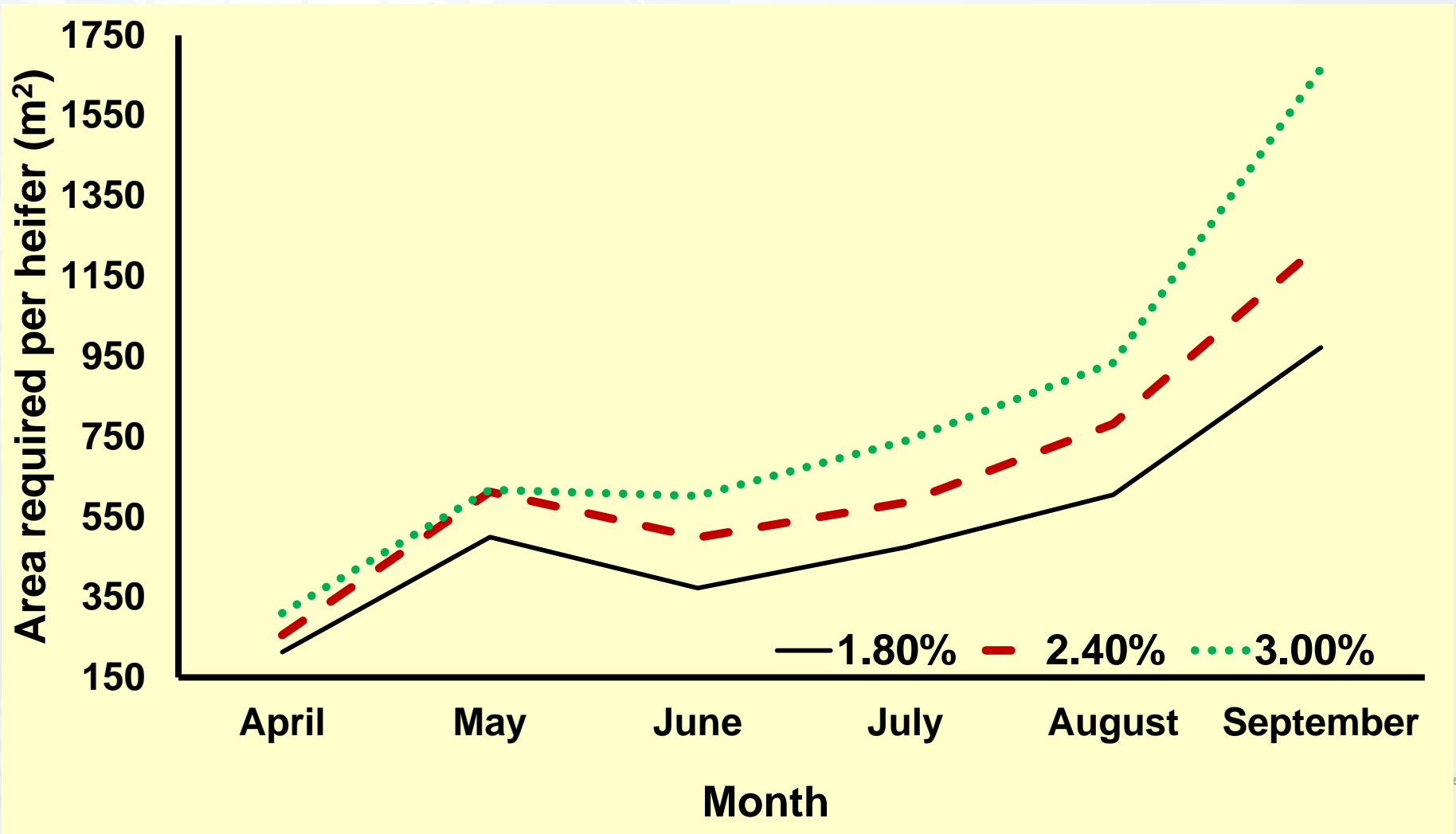
**Figure 3. Effect of pasture allowance on pasture utilisation across the season**



**Figure 4. Effect of pasture allowance on post grazing sward height across the season**



**Figure 5. Effect of pasture allowance on grazing area required across the season**



**Table 3. Effect of pasture allowance on pasture quality**

	Grazing Allowance						Sig.
	1.80%	SEM	2.40%	SEM	3.00%	SEM	
ADF (%DM)	26.69	0.34	26.82	0.35	27.04	0.48	NS
CP (% DM)	24.83	0.41	24.74	0.42	24.51	0.44	NS
DM (%)	14.96	0.51	15.08	0.49	15.15	0.48	NS
ME(MJ/kgDM)	11.71	0.06	11.69	0.06	11.64	0.09	NS



# Conclusions

Evidence from this study has shown Holstein dairy heifers' can exceed live weight gains of 0.80 kg day solely from grazed grass

Increasing pasture allowance from 1.8% to 3.0% improved heifer daily live weight gain by 0.18 kg day across the season, whilst pasture utilisation dropped 14.2%

Pasture production and pasture quality were not significantly affected by pasture allowance treatment

Increasing pasture allocation from 1.8% to 3.0% required an additional 50% of grazing area

Within this study a 2.4% pasture allowance was the optimal balance between animal and pasture performance

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