Can Lucerne improve animal performance?

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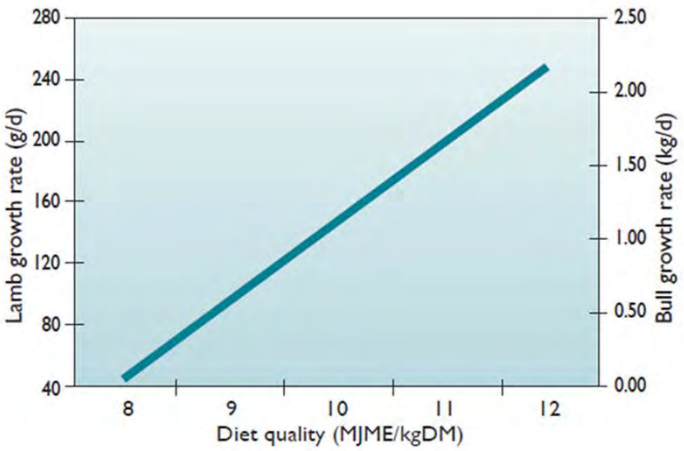
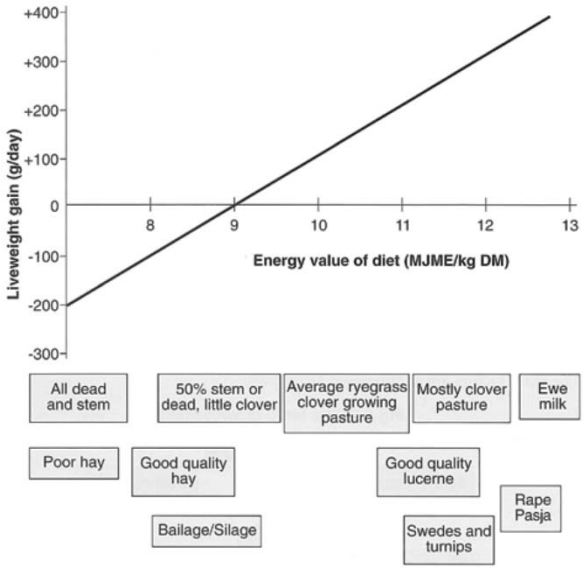
Animal performance – basic principals

- If you want to achieve high performance
  - do not restrict intake
  - maximise bite size
  - allow the animal the ability to choose
  - ensure herbage is of high quality

A basic principal

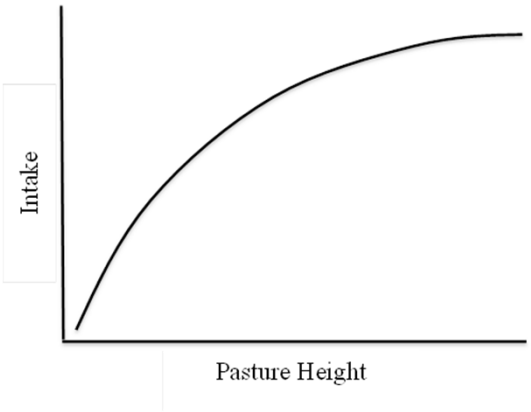


Pasture Quality Beef and Lamb
http://www.beeflambnz.com/Documents/Farm



400 Plus
A Guide to Improved Lamb Growth
for Farmers and Advisors, B&LNZ

Intake and sward height



Lucerne

- In the north Island Lucerne can be grazed from
  ≈ September to May/June
- Therefore there are many potential options for which animals are best (and when)
  - weaned lambs?
  - hoggets?
  - ewes and lambs?
  - cattle?
  - other options?

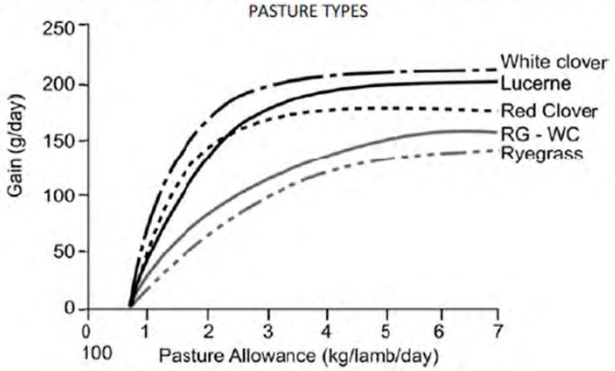
WEANED LAMB GROWTH

Lamb growth post weaning

	Pasture (g/day)	Lucerne (g/day)
Burke et al 2002	105 ±18	191 ±14
Robertson et al 1995	165.5 ±8.2	243.4 ±8.2
Scales et al 1995	195	222
Jagusch et al 1981 (December)	207±13	177±12
Jagusch et al 1981 (March)	128±15	178±16
Jagusch et al 1979	155	200
Rattray et al 1976	190	230
Nicol & McLean 1970	200±12	340±12

- ≈ 50g/d advantage to Lucerne on average
- many of these studies stocking rate higher
- unrestricted intake

PASTURE ALLOWANCE (KG DM/LAMB/DAY), LIVE WEIGHT GAIN (G/DAY) AND VARYING PASTURE TYPES



From: Jagusch et al., 1979. Crops, legumes and pasture for finishing lambs.

Feeding value of forages, based on live weight gain when fed ad libitum to growing lambs (Nicol and Brookes 2007).

Forage	Ranking	Trials
White clover	100	15
Chicory	95	1
Sulla	91	4
Lotus corniculatus	87	4
Lotus pedunculatus	84	6
Tetraploid ryegrass	83	1
Lucerne	82	12
Red clover	70	7
Timothy	67	5
Perennial ryegrass	52	16
Browntop	46	2

Lamb growth

- Rotational grazing
- Unrestricted intake
  - offer lambs an allowance of 2.5 to 3.5 kg DM/d. By keeping to this rule you will leave a suitable post grazing residue behind (i.e. ≈ 10cm)
- Not being forced to eat mature parts of plant
- Using other classes of stock to clean up

HOGGET GROWTH AND PERFORMANCE

Ewe hoggets pre-breeding

- Can we use alternative herbages for a short period pre hogget breeding to lift performance?

- Hoggets on herbages (herb mix vs. Lucerne vs. ryegrass/WC) for four weeks, finishing two weeks pre-breeding
- Then managed as one group on ryegrass/WC
- Bred as one group for two cycles (34 days)
- Scanning data collected

Hogget live weight change

	Start weight (kg)	End weight (kg)	ADG (g/d)
Rye/WC	37.4 ±0.2	42.7b ±0.2	147b ±6
Herb mix	37.3 ±0.2	41.2a ±0.2	105a ±6
Lucerne	37.4 ±0.2	44.1c ±0.2	197c ±6

Scanning performance

	Rye/WC	Herb	Lucerne
Proportion pregnant (%)	0.67a	0.80b	0.73ab
Proportion single (%)	0.49ab	0.61b	0.38a
Proportion twins (%)	0.18a	0.20a	0.35b
Fetuses/hogget	0.85	1.00	1.08

This will be repeated in 2016

BREEDING MATURE EWES

Breeding ewes on Lucerne

- Traditionally thought of as a bad idea due to phytoestrogens
- However, ewes can be grazed on Lucerne for up to three weeks prior to breeding to enable them to gain weight/condition and therefore improve reproductive performance
- With new cultivars is this still an issue?
- What about a shorter grazing period?

Breeding ewes on Lucerne

- Recent work from Australia with Merinos
- Ewes on Lucerne from 7 days prior to breeding and during the 36 days of breeding or just to day 7 of breeding

	Pasture	Lucerne till day 7	Lucerne throughout
Number lambs born per ewe presented for breeding	1.3	1.7	1.6

Planned 2016 study

- Will this work in New Zealand?
- Breed differences
- Our ryegrass/WC is likely of better herbage quality than in Australia over the summer period
- We intend to undertake a similar study in autumn 2016

EWES AND LAMBS IN LACTATION

Hoggets

- Aim: to determine if herb mix in lactation could increase the live weight of both the hogget and her lamb at weaning

Hogget study methods

- Single-bearing hoggets 2012 and in 2013 were offered:
  - Pasture mix (10 ewes/ha)
  - Herb mix (16 ewes/ha)
  - Lucerne (16 ewes/ha 2012, 10 ewes/ha 2013)
- Treatments began 7 days prior to expected start of lambing
- All ewes remained on feeding treatment until weaning

Lamb weights

Treatment	n	Birth	Weaning	Weight gain
Pasture mix	121	4.7 ± 0.1	24.6 ± 0.4 a	303 ± 5.6 a
Herb mix	162	4.6 ± 0.1	27.9 ± 0.4 b	351 ± 4.7 b
Lucerne	118	4.8 ± 0.1	31.4 ± 0.4 c	403 ± 5.7 c

- Average age at weaning = 65 days
- Hoggets on Lucerne and Herb mix also heavier at weaning

2015/2016 hogget lambing studies

- Twin bearing hoggets set stocked on either Lucerne or ryegrass/white clover
- Hogget and lamb performance will be followed to weaning
- Two tooth performance will be monitored

Mature ewes on Lucerne in lactation

- A series of studies were undertaken between 2009 to 2011 by Steven, Moot et al
- Lamb growth rates were greater on Lucerne than unirrigated pasture but similar to irrigated pasture
  - stocking rates where greater on Lucerne so per ha growth rates were 2 to 3 times greater than unirrigated pasture
- Ewe live weight and BCS also greater at weaning

Early weaning

- We have shown that weaned lambs (2014) onto herbs will perform better than those unweaned on pasture
  - being repeated this year on two sites

Treatment	n	Start	End	Weight gain
Pasture	48	20.2 ± 0.3	31.1 ± 0.5 a	278 ± 6 a
Herb mix	48	19.9 ± 0.3	34.6 ± 0.5 b	318 ± 6 b
Herb mix early wean	46	20.5 ± 0.3	34.1 ± 0.5 b	303 ± 6 b

2015 Lucerne early weaning study

- Twin bearing ewes will lamb on ryegrass/WC.
- When lambs are 18kg (average) there will be three treatments
  - weaned and placed on Lucerne
  - unweaned on Lucerne
  - unweaned on ryegrass/WC
- Ewes and lambs monitored to normal weaning age

YOUNG CATTLE

Heifer growth

- 60 crossbred (FR x J) heifer calves on 3 treatments
  - Ryegrass/WC
  - Herb mix (chicory, plaintain, red & white clover)
  - Lucerne

- 9 weeks over autumn

Heifer growth

	Lucerne (kg/d)	Herb mix (kg/d)	Pasture (kg/d)
2013	1.22*	0.78	0.57
2014	0.80	0.74	0.53

* Lucerne plus meal
2014 de Clifford et al
2015 Handock et al

Health management

- Slowly adjust animals to lucerne
  - allow time for rumen to adjust
  - this will limit potential for a ‘drop’ in performance
  - this will limit potential ill-health effects
- Providing hay is advised (or a higher fibre alternative)
- Salt blocks are advised

Health management

  - red gut – issue with high quality herbages
    - mixed grazing can reduce this
  - bloat (mainly an issue in cattle)
  - pulpy kidney
    - rapid growth can be a trigger, especially on high quality herbages
    - appropriate vaccination of the ewe pre-lamb
    - re-vaccination of lambs (weaning, followed by booster, maybe again at 18 months)

Lucerne management

- Farmers need to decide which class of livestock would benefit the most for each given period
- Summer – lambs, calves
- Autumn – finishing lambs, hoggets, ewes pre-breeding, calves
  - ewes during breeding (?)
- Spring – ewes and lambs, early weaned lambs(?)

Lucerne management

- To maximise performance on lucerne managed it for the 'benefit' of the plant
  - if you management like ryegrass white clover by hard grazing it performance will be disappointing and the crop will not last

Thank you!

- Acknowledgements
  - Beef + Lamb NZ
  - C Alma Baker Trust
  - Massey University Agriculture Experimental Station staff