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Te Whare Wānaka o Aoraki



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Management practices of dairy cows grazing kale

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Winter feeding for dairy cows



- Regaining body condition lost through lactation is a common goal for many NZ dairy systems
- Body condition score: 4.5 at drying off, 5.0 at calving
- Kale major component of their winter diet
 - high DM yield carried through winter with less deterioration in nutritive value compared to other feeds
- But, body condition gain on kale often does not meet farmers expectations

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Survey of kale DM yield and utilisation

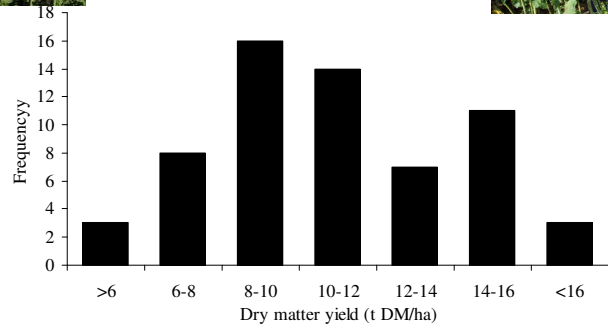
- Survey of kale feeding from 49 paddocks on 31 different farms across Canterbury
- DM yield, forage composition and utilisation measured



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Kale DM yield across Canterbury, 2007



Average: 10.9 t DM/ha

Intermediate stem types: 9.9 t DM/ha

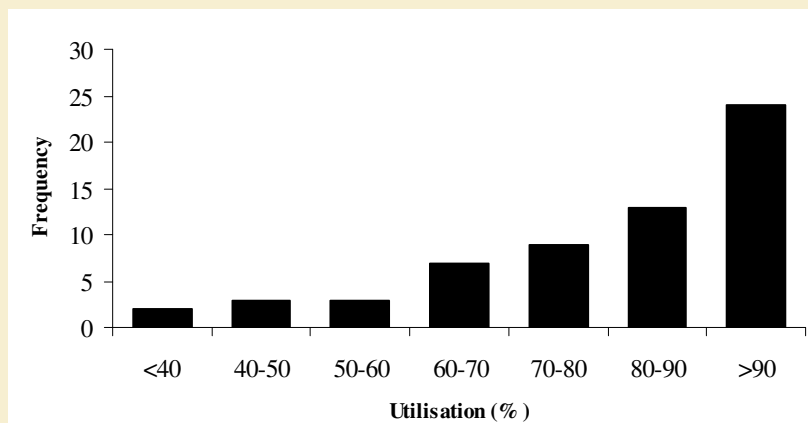
Giant stem types: 13.6 t DM/ha

Judson and Edwards (2008) Proc. NZ Grassland Assoc

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Kale utilisation (% of pre-grazing DM consumed) in 49 paddocks across Canterbury, winter 2007



- Kale utilisation ranged < 40 % to > 90 % on kale yields that ranged from 5-17 t DM/ha. Mean 80%.

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Utilisation



50%

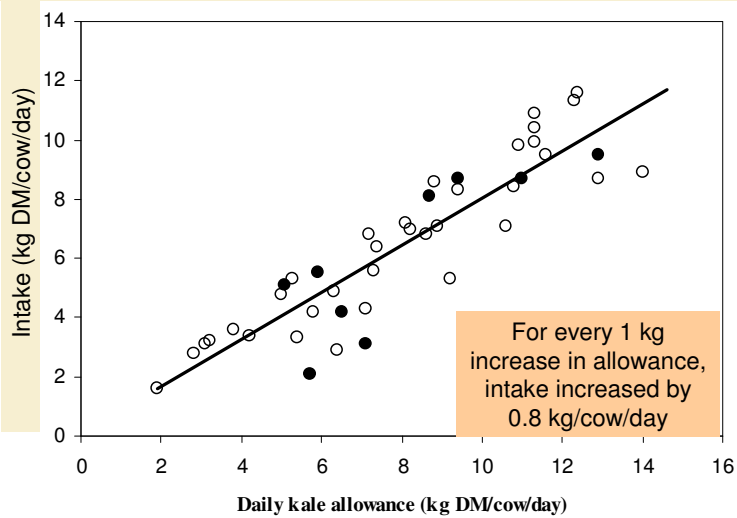


95%

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Intake and kale allowance

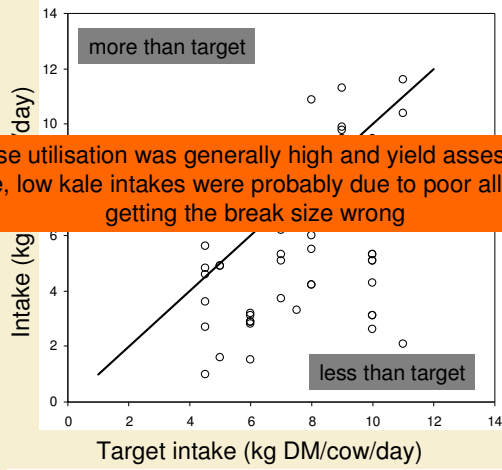


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Actual and target intake in 49 paddocks across Canterbury, winter 2007



Because utilisation was generally high and yield assessments accurate, low kale intakes were probably due to poor allocation – getting the break size wrong


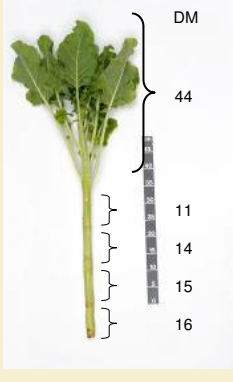
- Two thirds of the herds consumed less than the targeted DM intake by more than 1kg DM/cow/day.

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Kale quality

% total DM	Crop ME	Diet ME	Image	Image	% Total DM	Crop ME	Diet ME
24	12.7	12.7			44	12.9	12.9
17	11.6	12.2			11	12.4	12.8
19	9.7	11.4			14	11.6	12.6
20	9.8	11.0			15	9.4	12.0
20	6.6	10.1			16	8.6	11.5

Stemmy, giant type cultivars

Leafy, intermediate stem cultivars

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Adaptation to crop



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Offering kale without fibre

Table 3. Effect of four dietary proportions of kale: grass silage on dry matter intake and rumen pH

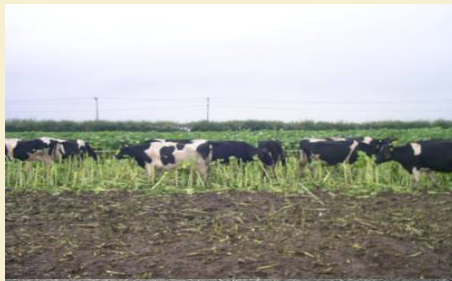
	Kale: Grass silage ratio			
	100:0	85:15	60:40	0:100
Kale DMI kg/day	7.32	6.35	4.90	-
Grass silage DMI kg/day	-	1.71	3.28	8.87
Total DMI kg/day	7.32	8.06	8.18	8.87
Mean rumen pH	6.26	5.91	6.32	6.32

French and Keogh, Morepark Dairy Production Research Centre,
Dairy Levy Research Update 2009, series No. 9

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Kale intake and utilisation on leafy and stemmy cultivars



- Kale Utilisation Experiment, Lincoln University, 6 weeks, winter 2008
- Regal and Caledonian sown on 1 Nov or 15 Dec 2007
- All offered at 11 kg kale + 3 kg straw allowance
- Measurements of utilisation, nutritive value, intake, effects on soil structure

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Kale plants from different cultivars and sowing dates



Caledonian 1 Nov



Caledonian 15 Dec



Regal 1 Nov



Regal 15 Dec

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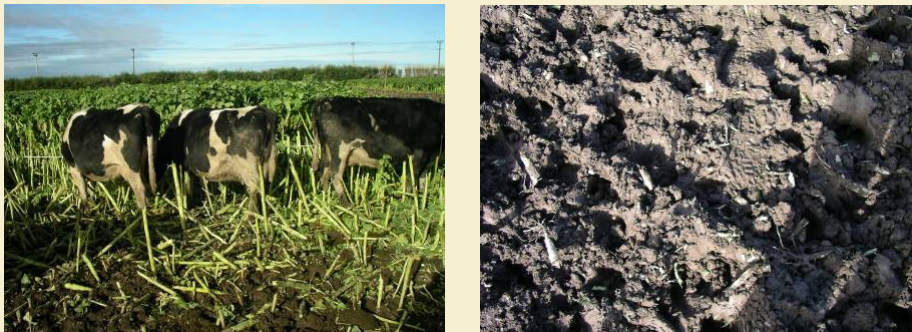


Regal



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Caledonian



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Kale Utilisation Experiment, Lincoln University, 6 weeks, winter 2008

Cultivar and sowing date	† DM/ha Pre Graze	% leaf	% DM	% Utilisation	kg DM eaten/cow/day	BCS gain
1 Nov Caledonian	17.3	23	14	88	9.4	0.45
1 Nov Regal	15.8	34	14	88	9.4	0.47
15 Dec Caledonian	14.4	28	13	91	9.7	0.48
15 Dec Regal	12.8	37	13	89	9.5	0.47

- ME intake of kale > 115 MJ ME/cow/day
- BCS gain low even in well fed cows on kale

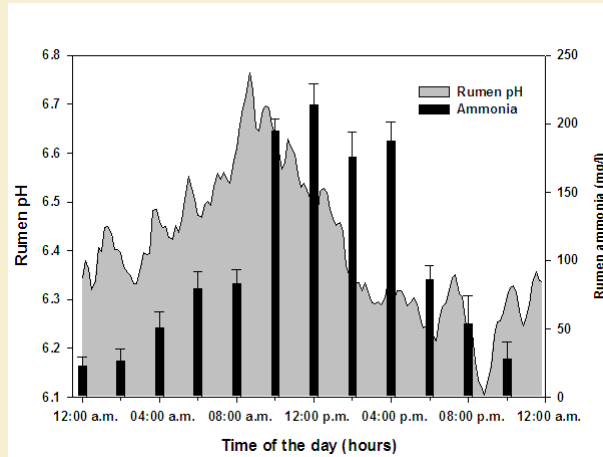
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Feedings systems of kale



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Rumen ammonia and pH on once per day kale feeding (9 am)



Jim Gibbs unpublished data

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Systems to improve rumen function

- Once versus twice per day break



- High versus low allowance (+/- straw)



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Alternative crops – Fodder beet



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Performance on kale versus fodder beet fed outdoors, and grass silage indoors, Irish study

Table 2. Effect of winter forage and allowance on animal performance parameters

Allowance			
Forage	Fodder beet	Kale	Grass silage
Dry period			
Liveweight gain	69	54	61
Body condition score gain	0.37	0.25	0.61
Subsequent performance for first 8 weeks in milk			
Milk solid yield (kg/day)	2.16	2.02	2.07
Liveweight loss (kg)	127	119	94
Body condition score loss	0.40	0.31	0.22

9 kg kale or fodder beet + 5 kg silage; adlib grass silage

Morepark Dairy Production Research Centre, Dairy Levy Research Update 2009, series No. 9 and Keogh et al. (2008) *Proceedings of the New Zealand Society of Animal Production* 68: 16-19.

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Alternative crops – Fodder beet



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Tips for allocating kale

- Have a plan
- Adapt cows gradually to kale
- Feed the right amount
 - Know paddock areas
 - Accurately estimate crop yields
 - Determine crop quality
 - Measure break sizes correctly
- Use straw/silage/hay to control 'intake rate' and anti-nutritional factors
- Use grass for springer cows if possible
- Make the system workable for staff

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