

Management of Dairy Cows on Kale in Winter.

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Kale as winter crop for dairy cows

- Kale is an important winter feed in southern New Zealand for dairy cows.
- Kale is capable of growing at lower temperatures than perennial ryegrass and produce a large amount of high quality DM (e.g. up to 18 t DM/ha) in winter.
- Kale maintains high nutritive value (85-90% digestibility, 12-13 MJ ME/kg DM, 15-25% CP in leaves) over the winter period.
- Body condition score (BCS) gain of cows on kale over winter may be less than expected

Utilisation of kale DM

- The quoted book figure for utilisation of kale by cows is often 70%
- A survey of 49 herds in Canterbury in 2007 showed utilisation ranged from less than 40% to greater than 90%, with a mean of 80% on kale DM yields that ranged from 5-17 t DM/ha. Free-draining soils and relatively dry conditions encountered during the survey are likely to have aided the high utilisation rate.
- However, utilisation of kale, even under wet winter conditions on deep, poorly drained soils at Lincoln, averaged 88%.

Allocation and target DM intakes

- Inaccurate crop allocation will have a major impact on DM intake and cow BCS gain.
- Two thirds of 49 herds surveyed in Canterbury consumed less than their targeted DM intake by more than 1 kg DM/cow/day and some by 8 kg DM/cow/day.
- As utilisation rates were high and yield assessments accurate, low DM intakes were due to poor allocation
- Accurate estimates of DM yield, paddock sizes and break widths are required to achieve target intakes.

Utilisation and crop and diet quality

- Nutritive value of kale is generally high (12 MJ ME/kg DM) but diet quality declines as grazing residuals decrease due to the poorer quality of the lower stem.
- In giant type cultivars, ME declined from 12.7 to 6.6 MJ ME/kg DM from the top (leaf) to bottom of stem. Similar figures were 12.9 to 8.6 MJ ME/kg DM for intermediate type cultivars.

Utilisation and crop and diet quality cont.

- Cows eating 84% of the medium stem type (leaving just the lower stem) would have a diet quality of 12.0 MJ ME/kg DM. Cows grazing 80% of a giant type (leaving just the lower stem) would have a diet quality of 11.0 MJ ME/kg DM.
- Post-grazing residuals are a useful tool to determine if dry cows fed on kale are getting their targeted daily intake and high diet quality.
- Leave one-quarter of crop behind to ensure high diet quality. Use left-over for stock classes with lower requirement for high diet quality.
- The cultivar *Caledonian* is a marrow stem type and has similar crop quality to leafy cultivars such as *Regal*. A Lincoln study showed similar body condition score gain (0.48 BCS units) on *Regal* and *Caledonian* over a winter feeding period.

Feeding systems

- Current once per day allocation of kale at low allowances (c. 11 kg DM kale cow/day) encourages high DM intake rates and may promote poor rumen function and protein limitation of cow.
- Cows may eat 9 kg DM of kale in the first 3 hours after a 9 am feed. Rumen ammonia levels rise sharply for 6 hours before falling off.
- Higher allowances (14 versus 11 kg/cow/day) lead to higher daily intakes, more even meal patterns throughout the day and better diet quality.
- Twice a day feeding and a break every 3-4 days are alternative strategies being explored to improve cow behaviour, diet quality and rumen function.
- Straw is important in controlling intake rate and cow behaviour; it may be less important in controlling rumen pH.

Alternatives to kale

- Limited New Zealand data on whether BCS gain is better on alternative crops to kale.
- Irish data showed cows offered 8 kg kale + 4 kg grass silage, 8 kg swedes + 4 kg grass silage or grass silage ad libitum indoors increased in BCS (0.20, 0.14 and 0.50 units, respectively, on UK 1-5 scale) while those offered 12 kg perennial ryegrass lost 0.22 units. There was no difference in milk, fat and protein yields among treatment groups in early lactation.