



Heat stress and nutrition

Technical Note N13

One of the major impacts of heat stress on dairy cow production appears to be through its effects on feed quality and dry matter (DM) intake. Potential pasture and cow management decisions that can be made to help alleviate this problem would be an important step towards improving milk production throughout the hotter months.

Impact of heat stress on cow nutrition

High temperature and humidity have a two-fold impact on dairy cow nutrition.

1. A direct effect on DM intake

Cows have been shown to voluntarily reduce intake by 9–13% in hot conditions.

Factors reducing feed intake include panting (see Photo 1), which reduces cud chewing, slows the breakdown of feed, and reduces the amount of water and buffers from saliva reaching the rumen.

Standing in the shade to keep cool also restricts grazing time and decreases intake.

Any form of stress, including heat stress, can slow rumen contractions, which in turn slows digestion.

2. A direct effect on forage quality

Humidity and high temperatures increase plant growth rate which increases the neutral detergent fibre (NDF) content of plants and reduces potential intake.

Feeding strategies to reduce the impact of hot conditions

Take feed to cows, rather than cows to feed in hot weather. Walking to feed increases a cow's heat load, so reduce their walking during the hottest time of the day.

Allow greater access to pastures for grazing at night. Cows will do up to 70% of their daily grazing at night time in hot weather.

High-fibre forages will generate more heat through digestion, compared with concentrate diets. Cows will voluntarily limit forage intake during hot weather, so provide good quality forages during these periods.

Increase the energy content of the diet with good quality forages and concentrates to make up for the shortfall in reduced intake and to reduce the metabolic heat load.

Increase the concentration of minerals and vitamins in the diet to compensate for the reduction in feed intake, particularly sodium, potassium, magnesium and niacin levels in the diet.

Supplementing cows with 1.5–1.6% DM of potassium and 0.5–0.6% DM of sodium will potentially improve milk yield in heat-stressed cows. Include magnesium at 0.35–0.4% DM to help to avoid metabolic problems (grass tetany) when feeding higher amounts of potassium.



A holstein friesian dairy cow that is panting from heat stress.

Including niacin (6 g/cow/day) may also be beneficial. It has been reported to reduce skin temperature and increase milk yield.

Improvement in milk yield has also been reported by feeding 150–200 g/cow/day of sodium bicarbonate during hot weather to help buffer the rumen.

Management strategies to reduce the impact of hot conditions

Provide cool, clean water and ample trough space in close proximity to cows at all times. In hot weather, lactating cows have the capacity to drink >100 L a day.

Cows may drink 50% of their daily water intake as they exit the dairy. A 200-cow herd may therefore require a supply of up to 5000 L of cool, clean water during the 1–2 hours that cows exit the dairy.

Allow access to shade throughout the day. Shade can reduce the cows' heat load from the environment by up to 50%. Provide shade in feed-out areas (Photo 2), grazing areas (Photo 3) and over the milking yards.

Cooling cows at the dairy with shade, sprinklers and/or fans before and after milking will improve their comfort and enhance their capacity to eat.

Let cows wander home and stand under sprinklers before the afternoon milking. Lowering body temperature will encourage higher feed intake during milking and pasture/forage intake after milking.

Queensland trials have shown that 30 minutes of wetting cows with sprinklers can produce an extra 1 L of milk; 60 minutes has produced an extra 1.5 L in hot weather. Sprinklers should deliver large drops to thoroughly wet cows' skin.

Refer to the 'Cool cows' book for a more detail on the prevention and management of heat stress in dairy cows under Australian environmental conditions.



Further information

Contact the DAFF Customer Service Centre by Phone 13 25 23, or
Email callweb@daff.qld.gov.au

More technical notes can be found at:
www.dairyinfo.biz

Cool cows book (Published in 2009 by Dairy Australia)

Protein Plu\$ checkbook (Published 2006 by DPI&F Qld)

Feed Plu\$ CD v4.0 (Published 2008 by DPI&F Qld)

Condition magician booklet (Published 2003 by DPI Vic)

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