



PERFORMANCE PRO-BIOTICS
DIRECT-FED MICROBIALS

HEAT STRESS IN DAIRY COWS

www.performanceprobiotics.com

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As summer approaches, many dairy nutritionists focus on what changes can be made to the rations of milking herds to cope with heat stress. Performance Probiotics offers a range of nutritional solutions to meet this challenge. The following article describes some of the theory behind heat stress in Australian herds and offers some practical solutions.

WHAT IS HEAT STRESS?

Heat stress occurs when the heat a dairy cow produces by her own activities (such as exercise and heat produced from digestion) and the heat from the environment, exceeds the capacity of the cow to lose this heat. As a consequence, a cow's metabolism responds in various ways to reduce this excessive heat load. Heat stress occurs on a regular basis in many regions of Australia, such as Queensland and New South Wales, during late spring through to mid-autumn. All Australian dairying areas can experience hot conditions at some time which can impact on a herd's performance.

WHICH WEATHER CONDITIONS LEAD TO HEAT STRESS?

A common index that links cow comfort to the weather is the Temperature Humidity Index or THI. The table below shows how air temperature corresponds to THI.

Temperature Humidity Index	68	70	72	74	76	78	80	82	84
Air Temperature (Low Humidity)	24	25	26	29	30	32	34	36	38
Air Temperature (High Humidity)	21	22	23	24	25	26	27	28	30
Cow Comfort Level	No Stress		Mild Stress			High Stress		Severe Stress	

Relationships between Temperature Humidity Indexes (THI) and air temperature (°C)

SO WHAT EFFECTS DOES HEAT STRESS HAVE ON MILKING HERDS?

As a general rule, milking cows start to be affected by heat stress once the maximum daily air temperature exceeds 25°C at low humidity and 22°C at high humidity. Often the impacts of low heat loads are quite subtle (such as small declines in intake and reduced in-calf rates). Noticeable impacts of heat stress, such as significant drops in milk production and physical symptoms such as panting, occur during moderate and high heat loads (e.g. THI 75 plus). The severity of heat stress can vary considerably between herds.

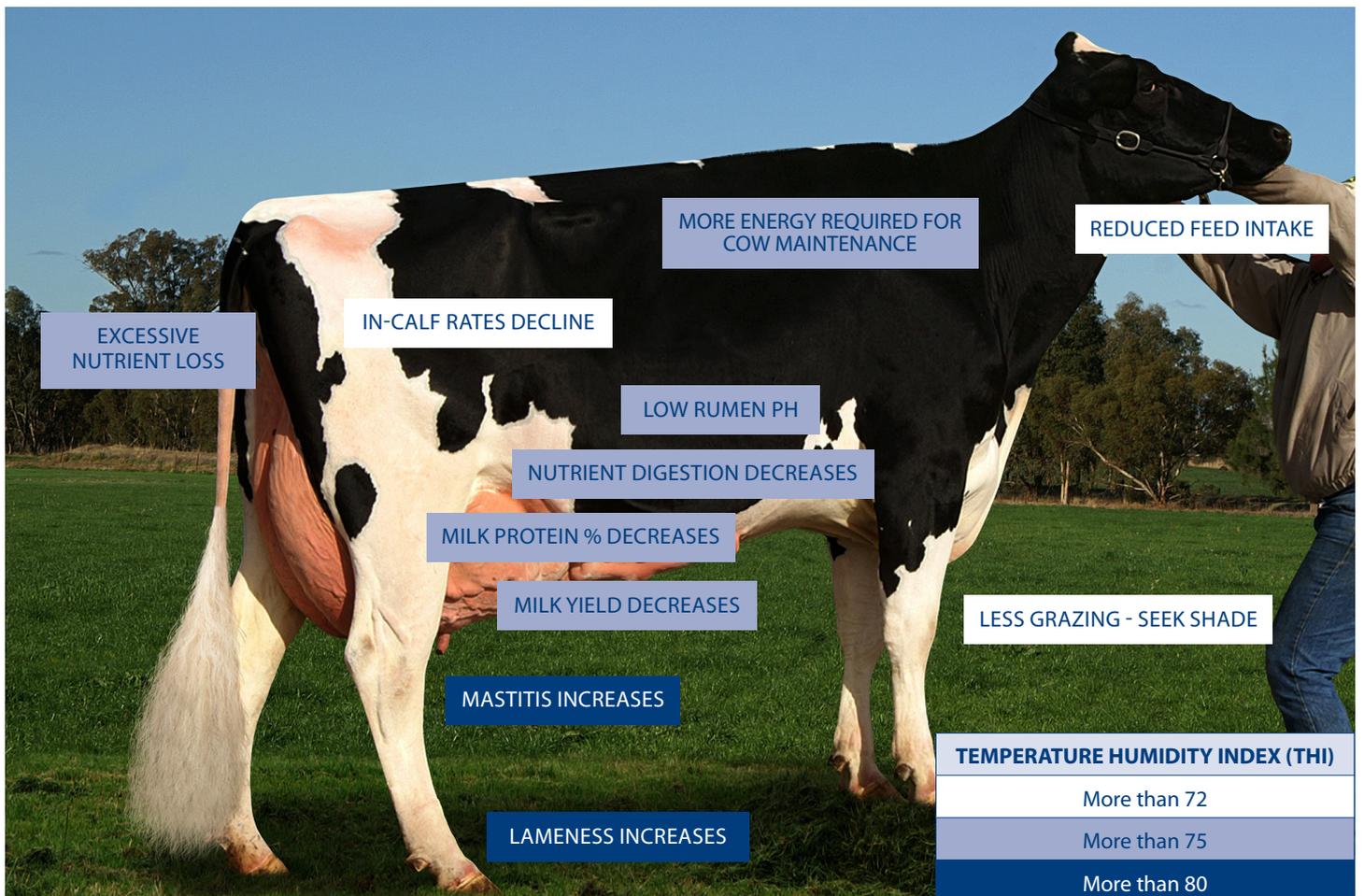


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IMPACTS OF HEAT STRESS ON MILKING DAIRY COWS



HOW CAN PERFORMANCE DFM HELP HEAT-STRESSED COWS?

Performance DFM is a proprietary blend of 'live', host specific bacteria, digestive enzymes and live yeast culture, which combines synergistically to increase feed utilization and help manage the rumen. Performance DFM can help with a number of major nutritional negatives of heat stress

IMPROVING COW FEED INTAKE AND MILK YIELD

Cow feed intake drops between 10-20% during heat stress. Milk yields can drop by 10-25%, and up to 40% in extreme circumstances. Two recent major scientific reviews (Robinson and Erasmus 2009, Desnoyers et al. 2009) have shown that yeasts can consistently improve the intake and milk yield of dairy cows. A recent study (Bruno et al. 2009) showed a response of 1.2 litres per cow per day from feeding yeast supplements to dairy cows during hot conditions.



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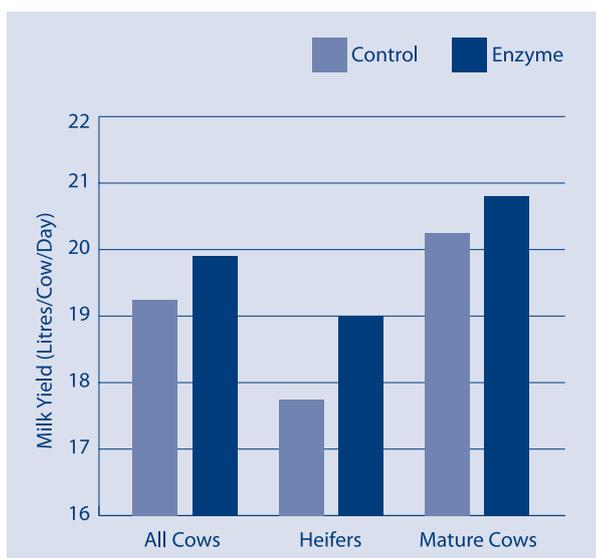
WHY DO HOT COWS PERFORM BETTER WHEN FED PERFORMANCE DFM?

Yeast supplements have been shown to regularly improve the rumen pH of dairy cows. The exact mechanism is unclear. A consequence of heat stress is that rumen pH drops due to cows excreting bicarbonate (and hence less flows into the rumen from saliva). Low rumen pH can lead to the rumen not working properly and over long periods of time, additional problems such as lameness. As the rumen is the major powerhouse for a dairy cow, keeping the rumen in a pH zone that drives maximum efficiency (e.g. more than 5.8) will drive nutrient supply to the rest of the cow. This also has the benefit of getting cows back into calf during a tough time of the year. Both yeasts and yeasts plus host specific bacteria, have been observed to minimise the time rumen pH is less than 5.5.

FEEDING ENZYMES DURING HEAT STRESS CONDITIONS.

Feeding enzymes that specifically break down fibre, such as hemicellulases in Performance DFM, has advantages during summer. In Australia, heat stress often coincides with the time cows are grazing mature ryegrass pastures or tropical pastures. These forages are often more than 60% fibre. These types of fibre also have low digestibility.

Diets based on high levels of fibre often limit intake. This is often caused by how slowly they are digested by the cow (rumen fill). If the digestion of this fibre can be increased, then a cow will eat more as well as absorbing more nutrients from the forage. Research carried out by NSW Department of Primary Industries in 2005 showed an increase in milk yield by feeding a fibre-digesting enzyme to cows grazing kikuyu.



Effect of fibrolytic enzyme supplement on the milk yield of cows grazing kikuyu



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HOW ELSE CAN PERFORMANCE PROBIOTICS HELP?

Performance Probiotics has a range of mineral and vitamins supplements, such as the Healthy Herd range, that can assist with health problems related to heat stress. These minerals and vitamins have high bio-availability.

- > Zinc for mastitis and lameness
- > Selenium for mastitis and reproduction
- > Cobalt for improved forage digestibility
- > Vitamin A (reduced liver storage), Vitamin E (reproduction) and Biotin (lameness)

	PERFORMANCE PROBIOTICS		
	DFM	MINERALS	VITAMINS
Improves milk yield	✓	✓	✓
Improves milk protein	✓	✓	✓
Improves rumen function	✓	✓	✓
Better reproduction	✓	✓	✓
Reduced mastitis	✓	✓	✓
Reduced lameness	✓	✓	✓
Healthier cows	✓	✓	✓

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