

Optimizing Your Production with Heat Stress Management

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It has been a long time coming but spring is starting to arrive, temperatures are rising and fields are starting to be cultivated and planted. It certainly is a busy time of year! Ironically planting is also a great time to think about the past year, and to look for ways to improve things in 2014. One method of increasing the bottom line in 2014 is to capture the profits available to you through incentive days. DFO announced this winter that incentive days are available July through November, and during the warmer months managing heat stress in your herd is a simple way to gain back potential production losses.

Cows ideally maintain their core temperature at 38.6 ± 0.6 centigrade. Many environmental factors affect this, including outside temperature, humidity, and ventilation. Cows will have to try to compensate when there is a deviation outside of this normal range. So how quickly does heat stress happen? One way to determine the approximate level of stress is by using the Temperature Humidity Index (Fig 1.) Research by Brouk et al. (1) has indicated that lactating dairy cattle begin experiencing heat stress at 20 degrees centigrade, and the severity of stress correlates to temperature and humidity. Cows are able cope with heat relatively well compared to other animals, however it comes at a heavy cost: milk production. Cattle compensate for heat in one of two ways; either by decreasing internal heat production by reducing activity, or by increasing evaporative cooling (through panting and sweating). Both of these mechanism have a negative impact on feed intakes, milk production, fertility, and, in severe instances, can lead to death.

Temperature Humidity Index for Dairy Cows

		Relative Humidity %											
		0	10	20	30	40	50	60	70	80	90	100	
Temperature °C	18	61	61	62	62	62	63	63	63	64	64	64	
	19	62	62	63	63	63	64	64	65	65	66	66	
	20	63	63	64	64	65	65	66	66	67	67	68	Stress
	21	63	64	65	65	66	67	67	68	69	69	70	Threshold
	22	64	65	66	66	67	68	69	69	70	71	72	
	23	65	66	67	67	68	69	70	71	72	73	73	Mild to
	24	66	67	68	69	70	70	71	72	73	74	75	Moderate
	25	67	68	69	70	71	72	73	74	75	76	77	Stress
	26	67	69	70	71	72	73	74	75	77	78	79	
	27	68	69	71	72	73	74	76	77	78	79	81	
	28	69	70	72	73	74	76	77	78	80	81	82	Moderate
	29	70	71	73	74	76	77	78	80	81	83	84	to Severe
	30	71	72	74	75	77	78	80	81	83	84	86	Stress
	31	71	73	75	76	78	80	81	83	85	86	88	
	32	72	74	76	77	79	81	83	84	86	88	90	
	33	73	75	77	79	80	82	84	86	88	90	91	Severe
	34	74	76	78	80	82	84	85	87	89	91	93	Stress
35	75	77	79	81	83	85	87	89	91	93	95		

Stress Threshold: Respiration rate exceeds 60 BPM. Milk yield losses begin. Reproduction losses detectable. Rectal temperature exceeds 38.5°C .

Mild to Moderate Stress: Respiration rate exceeds 75 BPM. Rectal temperature exceeds 39°C .

Moderate to Severe Stress: Respiration rate exceeds 85 BPM. Rectal temperature exceeds 40°C . Death rates rise.

Severe Stress: Respiration rate 120 - 140 BPM. Rectal Temperature exceeds 41°C .

Source: <http://www.omafra.gov.on.ca/english/livestock/dairy/facts/stressthres.htm>

On average, a herd can lose approximately 2.0 kg/cow/day of milk during heat stress. However, this impact can be much more severe in higher producing and early lactation cattle. In such cases, pregnancy rates can drop anywhere from 5-20% below current rates. Add this to increased feed refusal, and you may significantly affect the bottom line of your farm.

So what can we do to minimize heat stress?

1) Air movement/ventilation- You can use a variety of ventilation options and combinations to suit your barn's needs. General guidelines for ventilation are 500-1000 cfm/cow with air velocity between 220-500 fpm. Tunnel ventilation is a great way to increase air flow in tie stall barns. Speak to your veterinarian about the best way to address this in your barn.

2) Misters or sprinklers are another great way to reduce heat stress. Sprinklers can be set up in feed alleys, in rings around fans, and in holding pens etc. The idea is to apply enough water to make the cow wet intermittently and allow time for the evaporation process. Proper ventilation will greatly enhance the beneficial effects of having a sprinkler system in place.

3) Allowing cows outdoors on cool nights or evenings can greatly reduce the impacts of heat stress, as long as your barn is set up for easy movement of herds to outdoor spaces.

4) Ensure access to a clean fresh source of water to all cows, roughs and water bowls should be clean to encourage drinking. A rule of thumb would be to have the water source clean enough that you would drink out of it. A maximum 15-20 cows per trough and always have two water sources per group to avoid stress on lower ranked cattle.

Farmers who have installed heat abatement systems often find that return on investment is high, with the system paying for itself within a year or two. Take some time on your next herd health to discuss a strategy to implement a heat abatement system or improve your current system.