



HEAT STRESS



BE PROACTIVE VS. REACTIVE

As the mercury rises, your cows stress. This causes lower milk production, DMI and more. Even if you're comfortable, your cows are probably not. Get ahead of the game with these hacks and facts from D&D Ingredients.



Don't be fooled! Heat stress for cows begins when the temperature (68°F) feels quite comfortable for us.

As the THI increases cows begin to demonstrate visible signs of heat stress and performance is threatened:

- A THI of 67 (Not Stress) provides an environment for optimal cow performance and reproduction with rectal temperature of 100.5°F.
- At THI between 68 and 78 (Mild Stress), animals seek shade, respiration rate increases above 60 breaths per minute (BPM), rectal temperatures are 101.3°F and intake begins to decline.
- When THI is between 79 and 88 (Moderate Stress), respiration rates exceed 75 BPM and rectal temperatures are elevated (102.2°F); DMI, milk production and reproduction decrease; while salivation and water consumption increase.
- At a THI range between 89 and 98 (Severe Stress), respiration rates exceed 85 BPM, rectal temperatures rise (104°F) and there is excessive salivation marked by significant drops in intake, milk production and reproduction.
- With a THI greater than 98 (Extreme Danger), respiration rates exceed 120 BPM, there is high rectal temperatures (106°F) recorded and cows begin to suffer mortalities.

RELATIVE HUMIDITY (%)

	20	30	40	50	60	70	80	90
50	54	53	53	52	52	51	51	50
55	56	56	56	56	56	55	55	55
60	59	59	59	59	60	60	60	60
65	62	62	63	63	63	64	64	65
70	65	65	66	67	67	68	69	69
75	68	68	69	70	71	72	73	74
80	70	72	73	74	75	76	78	79
85	73	75	76	78	79	81	82	84
90	76	78	79	81	83	85	86	88
95	79	81	83	85	87	89	91	93
100	82	84	86	88	91	93	95	98
105	84	87	89	92	95	97	100	102
110	87	90	93	96	99	101	104	107

<68	Not Stressed
68-71	Stress Threshold
72-79	Mild Stress
80-89	Moderate Stress
>89	Severe Stress



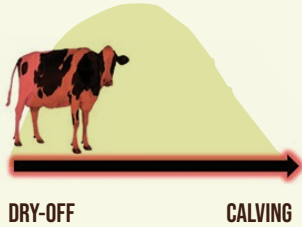
When the ambient temperature goes beyond 68°F, dry matter intake will decrease on average 0.17 lbs. for each degree above 68°F. For every one-pound loss in dry matter intake, it is estimated a production loss of two pounds of milk.



It's too late reacting to the physical signs of heat stress seen in the figure below because the cows are responding to a heat stress event two to three days earlier.

PHYSICAL SIGNS OF HEAT STRESS

LACTATION



PHYSIOLOGICAL EFFECTS

- ↓ Dry matter intake
- ↓ Blood flow in splanchnic tissues
- ↓ Circulating glucose concentrations
- ↓ Circulating nonesterified fatty acids
- ↓ Rumination/Lying time

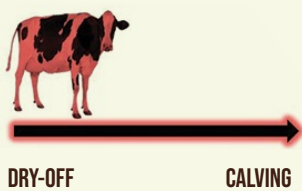
PERFORMANCE

- ↓ Milk production
- ↓ Milk components
- ↓ Fertility
- ↓ Conception rates
- ↓ Oestrus detection rates
- ↓ Follicular function
- ↓ Ovarian follicle size

- ↑ Respiration rate/panting/sweating
- ↑ Rectal temperature
- ↑ Insulin concentrations
- ↑ Glycogenolysis/gluconeogenesis
- ↑ Heat shock proteins
- ↑ Catabolic hormones: epinephrine, cortisol

- ↑ Days open
- ↑ Early embryonic death

DRY PERIOD



PHYSIOLOGICAL EFFECTS

- ↓ Dry matter intake
- ↓ Estrone sulfate
- ↓ Blood flow to uterus
- ↓ Immune functions
- ↓ Somatotropin effects

PERFORMANCE

- ↓ Milk production
- ↓ Gestation length
- ↓ Mammary gland involution

- ↑ Respiration rate/panting/sweating
- ↑ Rectal temperature
- ↑ Prolactin
- ↑ Heat shock proteins



Baumgard and Rhoads (2013) demonstrated via a paired feeding trial that the reduction in feed intake manifested during heat stress only accounted for about 35 to 50% of the drop in milk production. The rest of the milk loss is attributed to the redirection of glucose to support metabolic processes rather than milk synthesis.