



Dairy Pipeline

School of Animal Sciences

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Heat Stress—A Diverse Approach to Management

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Heat stress in dairy cows can begin when temperatures reach approximately 68-72°F, particularly when the temperature-humidity index (THI) is above 68. The THI combines air temperature and relative humidity into a single measure of heat stress risk. Cattle of all ages can be affected by heat stress, including calves, heifers, and lactating cows.

Most people focus their heat stress mitigation on the milking herd because one of the first measurable signs of heat stress is a drop in production. But, by the time production decreases, cows may have already been under stress for several days.

Look for signs of heat stress, including decreased feed intake, increased respiratory rate, and panting. Respiratory rates in healthy cows should be less than 60 per minute. When there are portions of the herd higher than that and panting or drooling, there is likely heat stress occurring.

Tried-and-true heat mitigation strategies include air movement and wetting the cows' backs. Air should be moving more than 2.3 miles per hour (mph), and ideally more than 4 mph.

Air movement should be measured at different levels and areas of the barn to ensure there are no spots where air is stagnant. In addition, bringing fresh air into the barn is important, the air exchange rate in the summer for adult cow housing should be 40-60 exchanges per hour. An easy way to test this on the farm is to fog the barn. Use a small insect fogger with mineral oil in various spots in the barn to create a fog. Watch where it flows and how long it takes to leave the barn. This will help estimate the exchange rate and also identify any dead spots in the barn.

		Relative humidity (%)							
		20	30	40	50	60	70	80	90
Temperature (°F)	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

Figure 1. Temperature Humidity Index (THI) for Cattle. Lactating dairy cows are at greater risk for heat stress when the THI exceeds 68. Referenced from <https://extension.umd.edu>.

Complementary to air movement is wetting the cows' backs. Place sprinklers above the feed bunk to wet cows' backs intermittently to cool them through evaporative cooling. The combination of air movement and water has been proven effective for cooling cows. Make sure the water is on the cows' backs and doesn't drift into feed or wet the bottom of the udder. Some considerations include having enough water pressure and having enough volume of water available, as well as additional space for the wastewater.

Heat stress affects all ages of cows and stages of lactation. While production is usually the primary focus because it is affected first, reproduction can also be adversely affected by heat stress. Cows and heifers will show fewer active heats due to the stress. Conception rates will plummet and early embryonic death will increase. This combination can make overall reproductive performance dismal in summer without heat mitigation. Always have plenty of fresh water available, have shade available for animals out on pasture, and continue to maintain fresh air and air flows.

Additionally, heat stress in late lactation and dry cows has been shown to have detrimental effects on production for the following lactation. The negative effects of heat stress on the calf are also quite noticeable. These calves will have lower birth weights, and newer studies show those calves will be less productive throughout their lives.

Addressing nutritional deficiencies in heat-stressed cows can also mitigate production losses. These include increased ration density, additional rumen buffers, and some additives that assist with feed intake. Work with your nutritionist to keep rations up to date.

A newer management tool in the toolbox for heat stress mitigation is the use of genetics. We've known about the 'slick' hair gene for a while now, but until recently, bull availability has been limited.

The slick hair gene was originally identified in Senepol beef cattle and has been introduced into the Holstein breed. This dominant recessive gene affects the prolactin receptor in the animal and causes a shorter hair coat, and also better thermo-regulation within the cows. Slick cattle have also

been shown to sweat more than non-slick cows, which assists with the natural evaporative cooling of the animal. All of these differences have been shown to reduce the effects of heat stress with increased production and lower internal body temperatures.

The availability of slick bull dairy genetics has increased substantially over the last five years. There are now bulls available with more than 3000 TPI points and respectable type and production traits. Additionally, there are a few homozygous slick bulls available. Since the gene is dominant, all offspring of a homozygous slick bull will express the slick gene. Now, moving a dairy herd to slick, more heat-resistant cattle can be accomplished more rapidly than ever before.

Don't lose sight of well-documented management options for heat stress, but consider utilizing genetics, which could bring more permanent results for producers.

Minimizing the Impact of a Droughty Summer

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Much of Virginia's dairy country is currently experiencing severe (D2) drought conditions. If dry weather continues, producers may face reduced pasture growth, lower crop yields, tighter feed supplies, and increased concerns about animal welfare. Together, these challenges can take a significant bite out of farm profitability.

While it's too late to purchase crop insurance or Pasture, Rangeland, and Forage (PRF) insurance for this growing season, there are several steps dairy producers can take to lessen the impact of an extended drought. These actions generally fall into three categories: production management, financial management, and disaster assistance.

Focus on Feed Efficiency

When feed supplies become limited, improving feed efficiency is often the fastest way to protect profitability.

Start by protecting cows from heat stress. Heat stress reduces feed intake, milk production, and reproductive performance while increasing water needs. Take time to inspect and repair fans, clean fan blades, and make sure ventilation systems are operating properly. Small improvements in airflow can pay big dividends during a hot summer.

Next, prioritize your best-producing animals. High-producing cows, fresh cows, and transition animals typically generate the greatest return from available feed resources. Lower-producing groups may be able to tolerate modest ration adjustments without significantly affecting overall farm profitability.

Drought conditions also provide an opportunity to reevaluate herd size. Consider culling more aggressively for low production, chronic health issues, or poor reproductive performance. You may also want to evaluate your replacement heifer inventory. Reducing excess heifer numbers or utilizing custom heifer growers may free up valuable feed resources without disrupting your herd dynamics.

Work with your nutritionist to identify lower-cost feed ingredients that can replace more expensive components without sacrificing production or herd health. Rather than focusing solely on price per ton, compare feeds on a cost-per-unit-of-nutrient basis.

Just as importantly, minimize feed losses. Proper bunker coverage, careful feed-out management, more frequent push-ups, and reducing refusals can stretch feed inventories and lower overall feed costs.

More milk is not always more profitable. Compare the marginal cost of additional feed with your net milk price. If the cost of producing another pound of milk exceeds the revenue received from that pound, reducing production may improve profitability.

Water is often overlooked until it becomes a problem. Inspect water systems for leaks, repair inefficient pumps, and monitor water availability closely. Clean water troughs regularly to encourage intake and maintain water quality.

Producers should also develop a water contingency plan. Identify alternative water sources and determine which groups of animals would receive priority if the primary water supply becomes limited.

Strengthen Financial Management

Good records become especially valuable during drought years. Maintain detailed records of drought-related expenses, including purchased feed, additional grazing costs, feed hauling expenses, and water hauling expenses. These records may be necessary when applying for disaster assistance programs.

A weekly or monthly feed inventory can also serve as an early warning system. Comparing current inventories to projected feed needs allows producers to identify potential shortages early and secure feed supplies before availability tightens and prices increase.

This year's drought also highlights the importance of risk management. Producers should evaluate tools such as forward contracting, futures/options markets, crop insurance, and PRF insurance to help manage future feed and milk price risk.

In addition, higher feed, fuel, and fertilizer costs can place additional strain on operating lines of credit. Meet with your agricultural lender early to ensure adequate operating capital is available throughout the remainder of the year. Good communication with your lender will be critical!

Explore Disaster Assistance Programs

Federal disaster assistance programs may help offset some of the financial impacts of drought. Producers should contact their local Farm Service Agency (FSA) office as soon as possible to determine eligibility and begin the application process. The application deadline is typically March 1st of the year following the disaster.

Livestock Forage Disaster Program (LFP):

Provides assistance for grazing losses when drought conditions reach qualifying levels. For dairy farms, the program generally applies to pasture and grazing acreage rather than cropland used for harvested forage.

Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish (ELAP):

May help cover drought-related expenses not addressed by LFP, including feed hauling and water hauling costs.

FSA Emergency Farm Loans: Producers located in designated disaster areas may qualify for low-interest emergency loans to help address drought-related financial challenges.

Emergency Conservation Program (ECP): May provide cost-share assistance for drought-related infrastructure improvements and installations such as wells, livestock watering systems, and water pipelines.

Final Thoughts

Drought years test both management skills and financial resilience. While producers cannot control rainfall, they can control how they respond to challenging conditions. Focusing on feed efficiency, protecting cow health, maintaining strong records, and taking advantage of available assistance programs can help reduce the financial impact of a dry summer and position the farm for recovery when weather conditions improve.

Upcoming Events

July 22, 2026

[Southeast Dairy Business Innovation Initiative](#)

Grants Opening:

- Dairy Business Planning Grant
- Specialty Processing Equipment Grant

July 30, 2026

[State 4-H Dairy Judging Contest](#) (Youth)

August 1, 2026

VA Summer Showdown

August 10, 2026

Rockingham County Fair

Monday – Saturday

September 25, 2026

[State Fair Junior Dairywomen's Contest](#) (Youth)

If you are a person with a disability and require any auxiliary aids, services, or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

Additional Notes:

- The dairy extension group is working with VDH to assist in distributing PPE to dairy farms. Request a kit online at <https://shorturl.at/ethov> or contact your local extension agent. Requests will be filled as supplies allow.
- Your input could guide future programming. Please complete the short survey at <https://tinyurl.com/dairy-extension>.

For more information on Dairy Extension or to learn more about our current programs, visit us at VT Dairy—Home of the Dairy Extension Program online at www.sas.vt.edu/extension/vtdairy.html



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