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Dairy Connection

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Combating Heat Stress in Dairy Cows

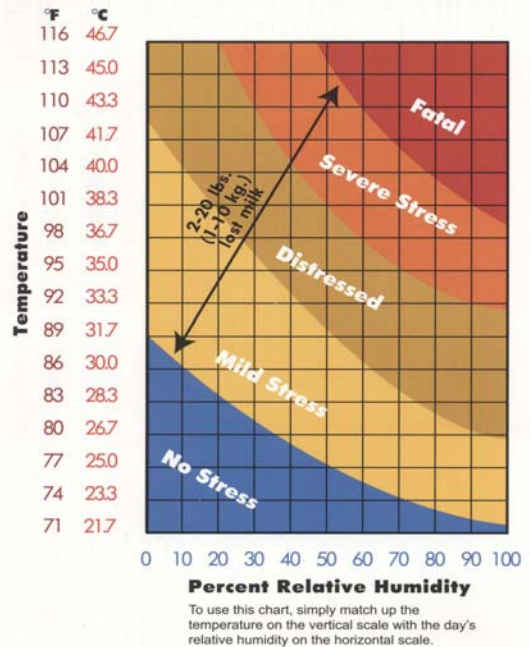
The ideal temperature range for cattle is between 25° and 65° F. Heat stress in dairy cows starts to show up at 75° F. (See Figure 1 below.) As the temperature increases, a cow's maintenance energy requirement goes up as she expends energy trying to cool herself, while her appetite and actual dry matter intake typically goes down. For every one pound decrease in dry matter intake, it is estimated that milk production declines 2 pounds. Above 90° milk production starts to decrease dramatically, from 3 to 20 percent. Dr. Joe West (Animal & Dairy Science Dept., University of GA), states that a cow experiences heat stress when she loses the ability to dissipate sufficient heat to maintain thermal balance and her body temperature rises. (the normal body temperature of a dairy cow is 101.5° F, but it can rise rapidly under heat stress conditions). This has a negative effect on many body functions such as dry-matter intake, reproduction, and milk production.

Humidity

Humidity contributes significantly to heat stress. The University of Nebraska—Extension states that there are three temperature-humidity ranges of concern. A temperature of 100°F and 20 percent humidity is the range in which serious measures should begin to ease the stress on the cattle. Some type of cooling should be started. The danger occurs as the temperature nears 100°F and 50 percent humidity. The lethal range for cattle is 100°F and 80 percent humidity. Heat stress typically affects early lactation cows more quickly and to a greater extent than later lactation cows.

air in any confined area. During heat stress, feed intake is reduced by 8 percent to 12 percent or more. Digesting forage generates more heat than digesting grain, thereby contributing to reduced intake. This decreased forage intake alters the composition of the rumen and leads to acidosis and reduced fat content of milk.

Dairy Heat Stress Chart



Signs of heat stress:

- Increased body temp. (>102.6F)
- Panting >80 breaths per minute (35-45 normal)
- Reduced activity
- Reduced feed intake (>10-15% reduction)
- Reduced Milk Yield (10-20% or more)

Why Dairy Cattle are So Susceptible to Heat Stress

Since cattle sweat at only 10 percent of the human rate, they are more susceptible to heat stress. This is the reason dairy cattle need mechanical means to reduce heat, such as body sprinkling to aid in evaporation and effective air movement systems to aid in cooling. Stale, stagnant air can reach dangerous or lethal areas in a short time. Therefore, it is essential to have rapid movement of

Other Effects of Heat Stress

Minerals are more easily depleted during hot summer months. Increased respiration and perspiration can result in an excessive loss of bodily fluids, which reduces mineral levels. The diet of the dairy cow needs to be adjusted to replace these nutrients. Potassium can be increased to 1.3 percent to 1.5 percent of the total dietary dry matter, sodium to 0.5 percent and magnesium to 0.3 percent

If less forage is consumed and the forage is high in quality, the cow's rumination activity may decrease. Consequently, the proper use of buffers becomes important to maintain intake, ruminal pH and milk production.

Heat also affects reproduction. Cows may fail to show heat during hot weather, exhibiting any estrus activity at night when temps are cooler. Some research has shown that the estrus period is shorter for cows under heat stress.

While cows can cool themselves to a certain extent, they may need some additional help. Following are ways that producers can utilize to help reduce the effects of heat on cattle.

Provide Shade

Keeping cows under shade, whether a stand of trees or a shade tent in a pasture, or a free stall or conventional barn, is one of the most effective ways to help reduce the effects of heat. Don't forget about your dry cows—they need shade as well.

Run Fans and/or Sprinklers

Air movement can be a very effective way to help cool cows by speeding up the evaporative process. Fans should be placed to maximize natural air flow and hit the greatest number of cattle. If fans are not enough, sprinklers can aid the process. Putting sprinklers on timers is an effective way to cool down cows without getting the environment too wet. Watch to make sure that udders do not get wet. The coolest place in the barn should be near the feed bunk to encourage eating. Fans, but not sprinklers, may be placed over free stalls. Another important area to use fans and sprinklers is the holding area where temperatures increase rapidly when cattle are concentrated before milking.

Provide Plenty of Fresh, Clean Water

Water is the most critical nutrient in a cow's diet. During heat stress, a cow may increase her water intake by 30% or more. When the temperature rises from 86° to 95° F, water consumption may increase from 21 to 32 gallons. Water sources should be placed close to feed bunks, in holding pens, and any other area cows congregate. Clean waterers frequently and make sure they are free of debris to encourage water intake. If you have well water, it may be a good idea to test your water for contaminants. Another way to increase water consumption is to offer cool water. One study found that cattle increased their water consumption when the water temperature was at 50°F rather than 82°F. You may also add water or wetter feeds to your ration to get additional water into cows.

Make Recommended Ration Changes

- ☑ Because dry matter intake will be down, rations will need to be adjusted to compensate. When cows are consuming less feed, you need to make your ration more nutrient dense, essentially by packing more nutrition into less feed.
- ☑ Consider adding fat to compensate for reduced energy intake. However, too much fat can also have a negative affect on intakes, so consult your nutritionist when considering adding fat to your ration.

☑ Rations that are lower in fiber produce less metabolic heat, but care must be taken to make sure that enough fiber is still consumed. One way to offset decreased forage intake and prevent acidosis is to feed high quality forage during the summer, thus requiring less intake to maintain a balanced ration. High quality forage is digested more quickly and results in less heat production. However, never reduce the fiber level below 18 percent to 19 percent ADF and 25 percent to 28 percent NDF.

☑ Minerals lost in respiration and perspiration need to be adjusted in the ration.

☑ Look for ways to stimulate dry matter intake.

- Make sure that bunks are completely clean before adding fresh feed.
- Feed less at a time, but feed more frequently throughout the day. This will also help to reduce feed spoilage in the bunk.
- Push feed up frequently.
- Try to feed larger amounts during the cooler early morning or evening hours. University of Nebraska research demonstrated that feeding 60 percent to 70 percent of the ration between 8 p.m. and 8 a.m. successfully increased milk production during hot weather.
- Add a buffer to your ration to help stabilize rumen pH, stimulate intake, and maintain components.

☑ Consider an additive to your TMR mix (like TMR Enhance-R) to help maintain freshness and reduce spoilage.

☑ Contact your area nutrition consultant for advice on ration changes during hot weather.

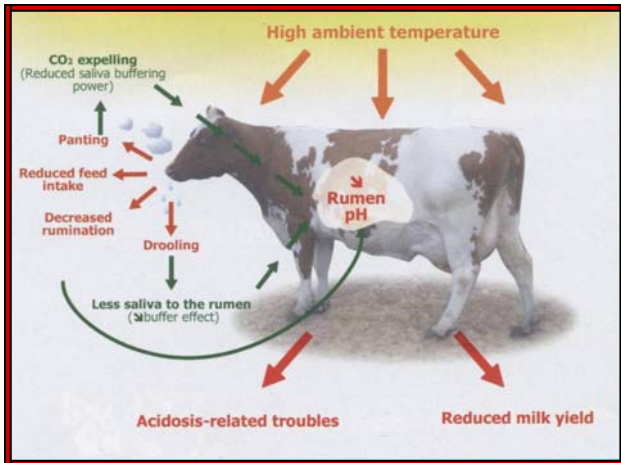
Summary

When hot, humid weather hits this summer, follow these steps to reduce the effects of heat stress on your herd:

1. Make ration changes to maintain feed intake and provide optimal nutrition.
2. Increase the amount of water available to the herd.
3. Provide shade.
4. Provide for a good air exchange in the barn and install misters to help cool the cattle.
5. Utilize a feed additive (like TMR Enhance-R) that can help improve intakes and feed palatability, and help to prevent feed spoilage.

Your secret weapon against summer heat and humidity.
 Combat summer problems before they even begin with:

TMR Enhance-R™



SOURCE: International Dairy Topics

The Economics of TMR Enhance-R

Research has shown that cows fed TMR Enhance-R produce 4 lbs. more milk per day than control groups.

	4 lbs. of Milk
X	\$ _____ per lb. of milk
=	\$ _____
-	\$0.16 cost of product
=	\$ _____
X	100 Cows
=	\$ _____
X	30 days
=	\$ _____ extra income per month

What TMR Enhance-R™ does:

- ☑ Stabilizes your bunk mix—it prevents reheating during times of heat or when you have freshly harvested forages.
- ☑ Enhances rumen function—research has proven that it enhances feed utilization.
- ☑ Improves/maintains dry matter intake.
- ☑ Improves/maintains milk production and components.

What TMR Enhance-R™ Contains:

1. **Crop Cure**—enhances bunk life by stabilizing the pH levels in forage & rumen.
2. **Buffering Agents**—the combination of buffering agents is more effective than a single buffering ingredient for improving appetite, milk production and fat test.
3. **Simple Sugar**—or rapidly fermentable carbohydrates, offering a quick source of energy.
4. **Concentrated Yeast Culture**—Increases feed digestibility by serving as a rich nutrient source for rumen bacteria. Improves feed palatability to promote intake.
5. **Magnesium**—additional magnesium aids in nutrient digestibility, improved performance and provides a calming effect.
6. **Potassium Carbonate**—additional potassium replaces potassium lost during heat stress.



JUNE IS DAIRY MONTH

Did you know . . .

- It takes more than 21 pounds of whole milk to make one pound of butter.
- The natural yellow color of butter is mainly from the beta-carotene found in the grass cows eat.
- The U.S. exports more than 9 % of its production annually (solids basis, 2006)
- It takes all the milk from 330,000 cows annually to fill the fluid milk needs of Walmart®.
- About 700,000 cows are needed to make all the dairy items sold through the Walmart® chain.
- About one third of all milk produced in the U.S. is used to make cheese.
- It takes 12 pounds of whole milk to make one gallon of ice cream.
- Vanilla is America's favorite ice cream flavor.

Facts from Midwest Dairy Association.

Vegetable Yogurt Dip

2 cups plain, low fat yogurt
 1 pkg. (10 oz.) frozen chopped spinach, thawed, drained
 1/3 cup fresh minced onion
 1 envelope (0.9 oz.) vegetable recipe soup mix
 Assorted raw vegetables for dipping

In a medium bowl, combine all ingredients (except vegetables.) Cover and refrigerate until ready to serve. Serve with vegetables for dipping.

Creamsicle in a Glass

1 can (6 oz.) frozen orange juice concentrate
 1 container (8 oz.) low fat vanilla yogurt
 1 cup low fat milk
 1 Tbsp. sugar
 1/2 tsp. vanilla extract
 3 ice cubes
 Orange slices for garnish

Place orange-juice concentrate, yogurt, milk, sugar and vanilla in blender. Process on medium until mixture is smooth. Increase speed to high and drop ice cubes, one at a time, through opening in blender cover. Process until ice is crushed. Garnish, if desired, and serve immediately.

Cheese-Stuffed Burgers

1 1/4 lbs. extra lean ground beef
 2 Tbsp. fine bread crumbs
 1/4 c. egg substitute
 1/4 tsp. seasoned salt
 1/2 tsp. chili powder
 4 slices part skim Mozzarella cheese
 4 Tbsp. low fat plain yogurt
 4 Tbsp. salsa
 4 thick slices red onion
 4 thick slices tomato
 4 pieces arugula or lettuce
 4 whole grain hamburger buns, toasted

Mix beef, breadcrumbs, egg substitute, seasoned salt and chili powder in a medium bowl. Divide mixture evenly into eight patties. Top four patties with a slice of cheese and cover with remaining 4 patties. Press edges together to seal in cheese. Grill burgers over medium-hot coals until desired doneness.

Mix yogurt and salsa in a small bowl. Place a burger on each bun and top with onion, tomato, arugula and salsa mixture.

All recipes from 3-A-Day™ Dairy



156 High Street—New Richmond, WI 54017
 (800) 472-6925

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