

**ANIMAL WELFARE ON ORGANIC FARMS FACT SHEET SERIES**

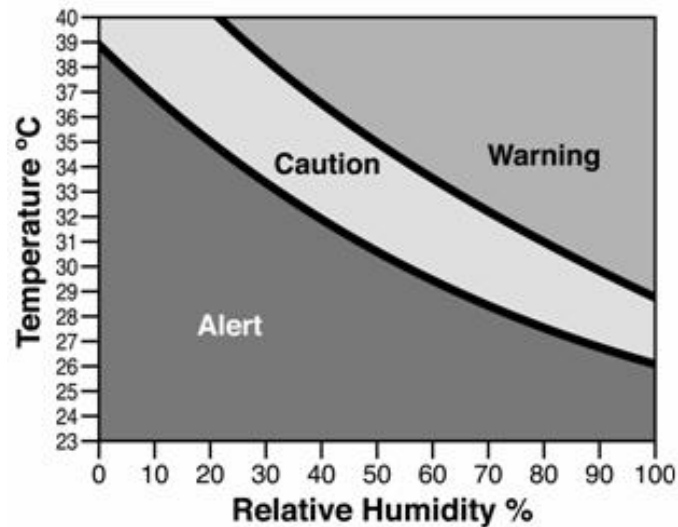
**HEAT STRESS IN RUMINANTS**

Produced in consultation with the ECOA Animal Welfare Task Force

**THE PROBLEM**

Heat stress can be a welfare issue for all types of livestock. In areas of Canada where high ambient temperatures occur during the summer months, the organic farmer must provide living conditions which give protection from excessive heat (see CAN/CGSB -32.310, 6.8.1).

Cattle can withstand low temperatures to -37°C but temperatures over 23°C (73°F) can cause stress when combined with high humidity, low air movement or direct sun. Stress starts to occur when the temperature humidity index is 68°F or above and becomes serious above 79/80°F. An abrupt increase in temperature when livestock have little time to adapt, or the first, very calm day during a heat wave is potentially lethal and can cause rapid dehydration in calves.



(Diagram from: *Beat the Heat*- Widowski 1998)

Heat stress can reduce productivity, cause reproductive problems such as reduced semen quality and lower birth weights, and compromise the immune system. Heat stress will reduce milk production in dairy cows: a 10% drop in yield at 27-32°C (80-90°F) and 50-90% humidity; and more than 25% drop at 32-38°C (90-100°F) with 50-90% humidity. The effect is more pronounced in higher producing cows.

Heat stress also lowers natural immunity making animals more vulnerable to disease in the following days and weeks. Problems with lameness occurring up to a few months after the event may also be attributed to heat stress.

Tolerance to heat varies:

- Holsteins are less tolerant than Jersey cows.
- Beef cattle with black hair suffer more from direct solar radiation than those with lighter hair.
- Lactating cattle are more susceptible than dry cows because of the additional metabolic heat generated during lactation.
- Heavier cattle over 1000lbs (455kg) are more susceptible than lighter ones.
- Sick or previously stressed animals are susceptible as are recently fresh cows.
- Cattle, alpacas and llamas are more prone to heat stress than sheep and goats (the comfort range of goats is 0-30°C (32-86°F)).

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## SIGNS OF STRESS

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When temperatures are high, monitor weather forecasts and look for signs of stress.

- Reduced feed intake (which is a natural response to reducing metabolic heat).
- Change in feeding patterns – more grazing at cooler times of the day.
- Cattle stand rather than lie down; sheep look for an area of cooler ground to lie on.
- Bunching or congregating in shade if it is available or around water when no shade is available.
- Rapid shallow breathing; open mouth breathing with panting at higher temperatures. Respiration rates increase with increasing temperatures from 14 to 34°C (57-93°F). If more than 20% of cows have respiratory rates exceeding 100 breaths per minute, action is needed to reduce stress.
- Sweating and increased saliva production.
- Lack of coordination and trembling.
- Increased water intake e.g. cows 10 gal/day at 20°C (68°F); 32gal at 35°C (95°F) and more for high producing cows. Requirements for beef cattle increase 150% between 21-32°C (70-90°F).
- Overheated sheep are prone to bloating.

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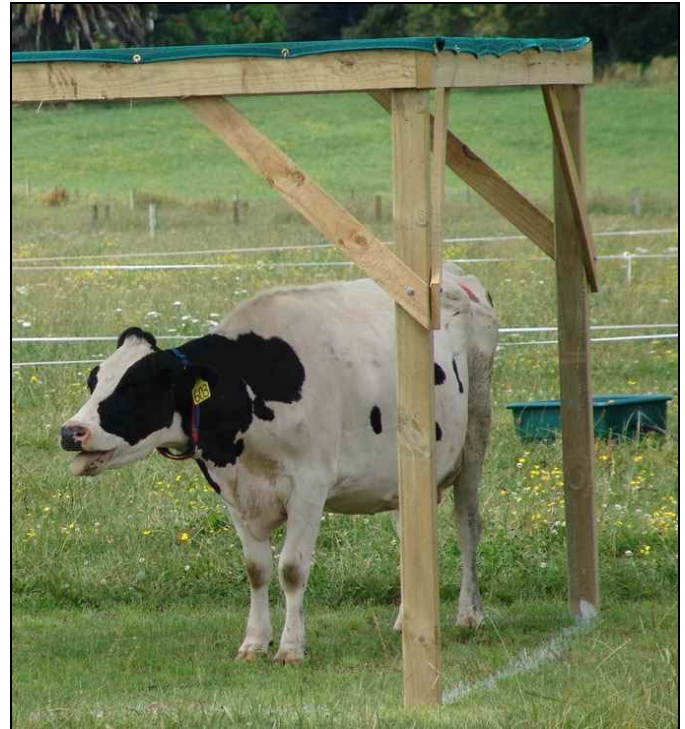
## TO REDUCE AND AVOID HEAT STRESS

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**Provide shade** from direct sunlight; e.g. trees, temporary shade using portable shade cloth blocking 50% of radiation, or permanent structures. All cows should be able to use the shade at the same time and there should be enough space for animals to lie down. Research on beef cattle shows improved weight gains and feed conversion efficiency with 45 sq ft (4.18 sq m) of shade/animal.

**Provide ample, cool, clean water** in shade near loafing areas. Cows will not travel across 30

metres of open field when temperatures, humidity and radiant solar heat are extremely high. Provide at least 1 watering station per 20 cows, with a supply of 3-5 gal (11-19L)/minute and a minimum 3" (8cm) depth. Calves will consume 3-6 gals (11-23L)/day. Finishing steers will require up to 20gal (76L/head/day).



Cow showing signs of stress (photo cr.) A. Rogers, AgResearch New Zealand

Cattle on range should be readily able to access water. Add extra stock tanks if necessary. In normal conditions the recommended maximum distance cattle should travel to water:

- steep slopes (>15%): ¼- ½ mile (0.4-0.8 km)
- moderate slopes (8% to 15%): ⅜-¾ mile (0.6-0.9km)
- flatter slopes (<8%): ¾-1 mile (0.9-1.6 km)

Other recommended practices:

- Increase air flow over the animals. Efficient use of fans will help alleviate heat stress

when animals are housed. All vents should be fully open.

- Minimize time spent in holding pens before milking.
- For dairy cows in pasture-based systems the use of sprinklers while the cows wait for the afternoon milking reduces heat stress. Sprinklers also reduce irritation from insects.
- Avoid handling cattle during hot, humid weather. If it is necessary to carry out stressful events (e.g. castrating, vaccinating), do it in the early morning.
- Avoid transporting livestock in hot weather; move between 8pm and 8am and reduce loading density. Do not move animals from a relatively cool environment to a hot environment during the summer.
- Reduce biting fly populations (with improved sanitation, repellents and traps) which tend to cause cattle to bunch together.
- Provide access to high quality forage (e.g. first cut dry hay) in feed bunks in shaded areas even if cows are also on good quality pasture.
- If finishing cattle, shift daily feed delivery toward evening.
- Keep livestock in a good body condition – fatter animals have more problems.
- When using management intensive grazing, rotate through fields more quickly - taller grass is a cooler surface; rotate in evening rather than in the morning; graze paddocks that allow access to barn or trees during the heat of the day.
- Use opaque calf hutches in preference to translucent hutches and space them to allow for adequate air flow. Provide supplemental shade for young calves.
- Shear in spring or early summer before temperatures rise to give the fleece a chance to regrow a bit. Protect recently shorn sheep from prolonged exposure to sun. Water

consumption during heat stress is higher in shorn than in unshorn sheep and there is a greater reduction in roughage intake.

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### **TREATING SUNSTROKE OR HEAT EXHAUSTION**

Treatments to lower body temperature include cold water submersion, cold water enemas, ice applications, alcohol rubs and in the case of sheep or llamas, cold water applied to body parts with little wool (head and lower legs). Move to cool shaded area. Provide oral administration of fluids to dehydrated animals.

Homeopathic remedies can provide relief if sunstroke is indicated with very high temperature, rapid pulse, shallow breathing and a reluctance to move. Hansford & Pinkus in *The Herdsman's Introduction to Homeopathy* recommend the following: Use Aconite 30C – one every 15 minutes if worse for standing and shows anxiety. Belladonna 30C can be used alternately where the animal is excited and has dilated pupils; if recumbent and limbs tremor and jerk use Glonoine 30C. Dose every 15 minutes, gradually increasing time between doses until improvement is seen. Always stop with improvement.

Call the vet.



**Shade is essential to the welfare of farm animals in areas where the typical summer temperature exceeds 23°C and the temperature humidity index exceeds 68. (photo cr. Neil Anderson)**

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## SOURCES OF INFORMATION

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Extension service fact sheets from a variety of sources: Ontario Ministry of Agriculture (OMAFRA), South Dakota State University Cooperative Extension Service, Virginia Cooperative Extension, University of Nebraska, Ohio State University, University of Arkansas, NRCS Texas, and miscellaneous industry newsletters.

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(photo cr. Mike Main)

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