Cattle SOP 001	Version: 1.0	Effective Date: 7/13/2017
Title: Cattle Pasture Requirements		

Background

Feedlot and Housing Systems

Beef cattle used in research or teaching may be housed in intensive management systems, either indoors or in open lots, with or without shelter. Facilities for beef cattle must provide cattle with opportunities for behavioral thermoregulation (e.g., access to a windbreak, sunshade, mound, or roofed shelter). In feedlots, cable or wire fencing has minimal effect on natural airflow in summer. However, high airflow rates are undesirable during periods of low temperature, and tree shelterbelts and other types of windbreak can decrease the rate of airflow past the cattle.

Thermal Indices

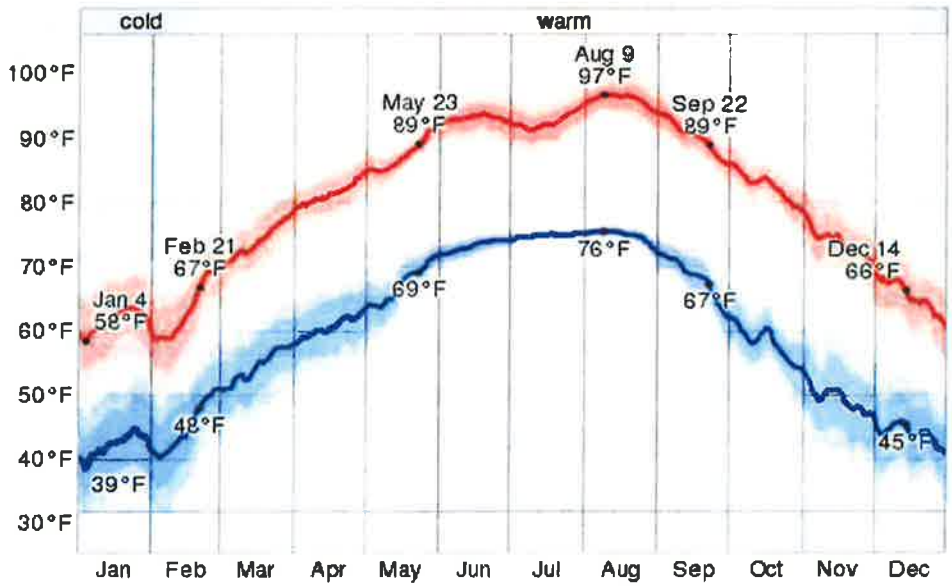
At the present time, the temperature-humidity index {THI}; THI = 0.8 × ambient temperature + [(% relative humidity/100) × (ambient temperature − 14.4)] + 46.4} has become the de facto standard for classifying thermal environments in many animal studies and selection of management practices during seasons other than winter. The THI has been extensively applied for moderate to hot conditions, even with recognized limitations related to airspeed and radiation heat loads (NOAA, 1976). A THI between 70 and 74 is an indication to producers that the potential for heat stress in livestock exists. In particular, when THI values are above 70 by 0800 h, it is recommended that managers of confined cattle that

have high metabolic heat loads (e.g., feedlot cattle) initiate or prepare to initiate heat-stress management strategies before cattle become exposed to the excessive heat load.

Waller County Texas Daily Temperature Graph

Over the course of a year, the temperature typically varies from 39°F to 97°F and is rarely below 31°F or above 100°F.

Daily High and Low Temperature



The daily average low (blue) and high (red) temperature with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

The *warm season* lasts from May 23 to September 22 with an average daily high temperature above 89°F. The hottest day of the year is August 9, with an average high of 97°F and low of 76°F.

The *cold season* lasts from December 14 to February 21 with an average daily high temperature below 66°F. The coldest day of the year is January 4, with an average low of 39°F and high of 58°F.

Thermal Heat Index Calculated for Waller County Using Average Low Nighttime Temperature

Temperature F	50%H	55%H	60%H	65%H	70%H	75%H	80%H	85%H	90%H
70	63.32	63.33	63.33	63.33	63.34	63.34	63.34	63.35	63.35
71	63.77	63.77	63.78	63.78	63.78	63.79	63.79	63.80	63.80
72	64.22	64.22	64.22	64.23	64.23	64.24	64.24	64.24	64.25
73	64.66	64.67	64.67	64.68	64.68	64.69	64.69	64.69	64.70
74	65.11	65.12	65.12	65.12	65.13	65.13	65.14	65.14	65.15
75	65.56	65.56	65.57	65.57	65.58	65.58	65.59	65.59	65.60
76	66.01	66.01	66.02	66.02	66.03	66.03	66.04	66.04	66.05
77	66.45	66.46	66.46	66.47	66.47	66.48	66.48	66.49	66.50
78	66.90	66.91	66.91	66.92	66.92	66.93	66.93	66.94	66.94
79	67.35	67.35	67.36	67.37	67.37	67.38	67.38	67.39	67.39
80	67.79	67.80	67.81	67.81	67.82	67.83	67.83	67.84	67.84

Based on the average nighttime low temperature and the average humidity, the THI must not exceed the critical threshold of 70 for any time in the summer months.

****During the daytime, shade is essential to prevent heat stress in cattle. ****

Guidance

Heat Stress

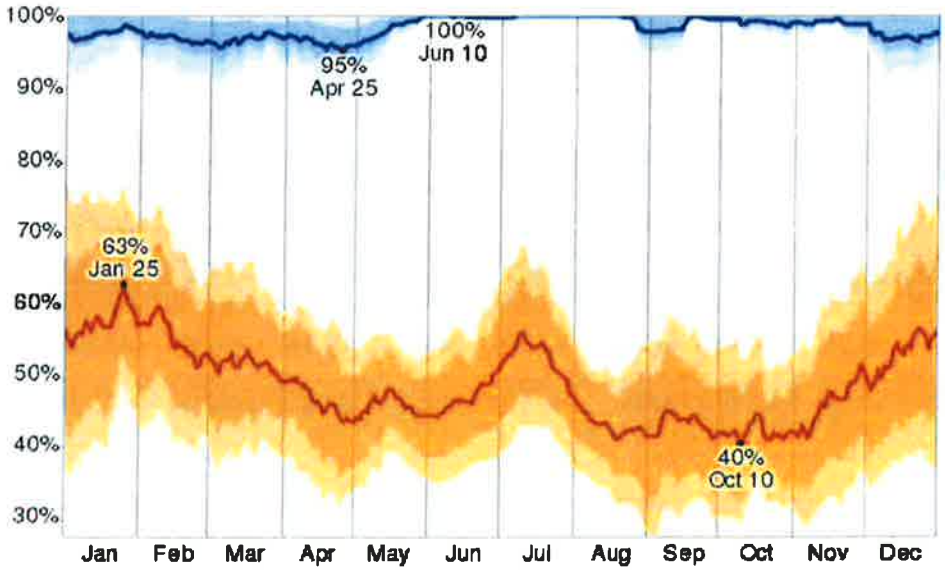
During potentially stressful heat episodes (nighttime THI that are near THI of 70), the following panting scores will be used as an indicator of stress levels experienced:

Waller County Texas Daily Humidity Graph

The relative humidity typically ranges from 40% (comfortable) to 100% (very humid) over the course of the year, rarely dropping below 27% (dry) and reaching as high as 100% (very humid).

The air is *driest* around October 10, at which time the relative humidity drops below 47% (comfortable) three days out of four; it is *most humid* around June 10, exceeding 100% (very humid) three days out of four.

Relative Humidity



The average daily high (blue) and low (brown) relative humidity with percentile bands (inner bands from 25th to 75th percentile, outer bands from 10th to 90th percentile).

1 = elevated respiration rate

2 = drool or saliva present on side of mouth

3 = open mouth breathing observed

4 = tongue and neck extended with open mouth breathing

Any signs of heat stress observed must be recorded and the veterinarian and manager immediately contacted.

Alleviation of Heat Stress

When cattle are beginning to experience panting scores of 2 or greater some means of cooling may be needed. Wetting the ground or floor of holding facilities can be an effective method of cooling cattle managed in unshaded, outdoor units where surface vegetation is sparse or nonexistent. Direct wetting of cattle during extreme heat is also an effective practice and is often used as an emergency measure. Benefits of sprinkling are enhanced if sprinkling is started in the morning, before cattle experience high heat loads. Fogger nozzles are less effective than sprinkler nozzles because of the barrier formed by the fine droplets (mist). Misting cattle was not as effective as shade in decreasing heat stress.

Shade for Cattle

Shade for cattle can provide the margin of survival for animals that are unconditioned to a sudden heat wave with high solar radiant loads in central and southern regions of the United States. For optimum benefits shades must be 3.6 to 4.2 m (12 to 14 ft) high in areas with clear, sunny afternoons (e.g., southwestern United States) to permit maximum exposure to the relatively cool northern sky, which acts as a radiation sink. In areas with cloudy afternoons (e.g., eastern United States), shades 2.1 to 2.7 m (7 to 9 ft) in height are more effective, as they limit the diffuse sky radiation received by animals beneath the shades. The amount of shade required for young cattle is 0.7 to 1.2 m^2 (7.5 to 13 ft^2) per animal, whereas larger cattle need 1.8 to 2.5 m^2 (19.4 to 27 ft^2) per animal.

Wind barrier for Cattle

Proper airflow and ventilation are essential in intensive facilities. In feedlots, cable or wire fencing has minimal effect on natural airflow in summer. However, high airflow rates are undesirable during periods of low temperature, and tree shelterbelts and other types of windbreak can decrease the rate of airflow past the cattle. An 80% solid windbreak 3 m (10 ft) high (minimum recommended height) decreases wind speed by half for about 45 m (150 ft) downwind and controls snow for about 8 m (25 ft); a similar windbreak 4 m (13 ft) high decreases wind speed by half for about 65 m (200 ft) downwind and controls snow for about 10 m (30 ft). A windbreak is recommended in mounded, south-sloping feedlots in the northern United States to provide dry resting areas with low air velocities. Caution must be exercised when placing cattle in sheltered areas in the summer because of the adverse effects of restricted airflow on cattle reared in hot environments.

Although snow is rare in Prairie View, wind barriers are still important for the winter. The decrease in wind speed will greatly reduce the wind chill effect. This is especially important for young cattle. Wind barriers on the north side of pastures must be available. They must span enough of the north side of the fields so that all cattle can benefit from the wind barriers.

Watering Systems

Availability of fresh, unfrozen water is critical for grazing beef cattle, and distance to water must be given consideration in pasture and range systems. If cattle are required to travel long distances to water in hot, dry climates, animal performance and utilization of pasture forage can be affected. It is recommended that distance to water be no greater than 1.6 km (1 mi) in rolling, hilly country and in undulating, sandy terrain. This recommendation was decreased to 0.8 km (0.5 mi) in rough country, increased to 2.4 km (1.5 mi) in smooth, sandy terrain, and increased to 3.2 km (2 mi) in areas with flat terrain. Thus, the distance to water for grazing cattle must not exceed 3.2 km, and every animal must have the opportunity to drink ad libitum at least once per day.

All water sources for cattle will be checked each day. This will be indicated on an auditing log and be available during every inspection.

Reference

Federation of Animal Science Societies 2010. Guide for the care and use of agricultural animals in research and teaching. Champaign (IL): Federation of Animal Science Societies

Signatures

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