

# Cow Comfort and Cooling

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# Keys for Cow Comfort

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- Adequate feed access
- Adequate water access
- Clean, dry, comfortable resting area/location
- Adequate ventilation
- Thermal relief
  - Cold → Wind protection (barn or wind breaks)
  - Hot → Several phases/steps - *Focus for today*

# Heat Stress Evaluation Tool

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## ThermalNet (website)

- <http://thermalnet.missouri.edu/index.html>
- Website provides educational information about the thermal environment and how it can affect dairy cows

## Thermal Aid APP

- Smartphone app
- Can pull live weather data to calculate THI
- THI can be used to help determine heat stress conditions
- Has a timer use when calculated respiration rate

1. Drinking Water Systems
2. Shade Systems
3. Adequate ventilation in freestall, loafing or bedded pack barn
4. Fan Systems
5. Sprinkler Systems

## **IMPLEMENTING HEAT STRESS RELIEF SYSTEMS – ACTIONS TO TAKE**

# Drinking Water Systems

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1. Daily intake – up to 50 gallons or more
2. Drinker space – one “hole” or 2’ of trough
3. Minimum of 15 to 20 cows per drinker not adequate for hot weather.
4. Provide for 25% of group when hot.
5. Provide water at exit of parlor.

# Shade Systems

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## 1. Holding pen

- a) Needed because cows crowded.
- b) Roof, if present, provides for shade.
- c) If no roof, construct frame and shade cloth structure.
  - i. Remove in fall.
  - ii. Reinstall in spring.

# Shade Systems

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## 2. Feed Bunks

- a) Improve cow comfort while eating.
  - i. Cows will tend to eat more.
  - ii. Cows will go eat.
- b) Improve “bunk life” of feed.

# Shade Systems

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## 3. Resting Areas and Freestalls

- a) Freestall barn itself provides shade
- b) Required for lots or pasture systems
  - i. Provide 25 ft<sup>2</sup> to 50 ft<sup>2</sup> per cow.
  - ii. Orient shade structure north and south.
  - iii. Watch location of shade with respect to fence.



# Adequate Ventilation

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- Natural Ventilation System
  - Need open area high for both winter and summer
  - Open curtains and/or remove barn siding to allow large openings in both sidewalls and endwalls.
  - If ‘cooling fans’ used, orient fans to aid wind to ventilate barn
- Mechanical Ventilation (Hot Weather System)
  - Need enough fan capacity to exchange all air in barn at least once per minute
  - Need openings distributed throughout barn as air inlets to match installed fan capacity. Inlet area (in<sup>2</sup>) = (total cfm) / 4

# Fan Systems

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## 1. Fan Location

### a) Holding Pen

Front of pen, blowing toward back.

### b) Freestalls

Above neck rail, tilted slightly to blow across cows lying in stalls.

### c) Loafing Areas

Arranged to provide air movement across cows lying in resting areas.

# Fan Systems

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## 2. Fan Selection

- a) Effective throw – 10' per foot of diameter of fan for open propeller fans
- b) Typically (historically) most economical selection is 36", ½ h.p. direct drive fan.
- c) “High velocity” fans may have longer throw but check in barn.

# Fan Systems

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## 3. Electrical Supply

- a) 36", ½ h.p. direct drive fan uses 5 to 6 amps at 110 volts or 2½ to 3 amps at 220 volts.
- b) Installation cost of electrical system can be quickly recovered with effective cooling system which includes sprinklers.

# Fan Systems

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4. Operation and Management
  - a) Operate in holding pen during and potentially prior to milking.
  - b) Operate at all temperatures greater than 75 °F.
  - c) May operate at all temperatures greater than 70 °F at night.
  - d) Lower “on” temperatures may be needed for high producing cows.

# Sprinkler Systems

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## 1. Emitter Types

- a) Sprinklers
- b) Drippers
- c) Misters
- d) Foggers

# Sprinkler Systems

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## 2. System Selection and Location

### a) Sprinklers

- i. Feed bunk alleys – 180° pattern
- ii. Holding pens - 360° pattern

### b) Foggers on Circulating Fans

- i. Use when wet floors and surfaces not acceptable (lots & loose housing)
- ii. Air is cooled so cows must be located in throw of fans to receive cooling.

# Sprinkler Systems

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## 3. Water Supply

a) Importance of Quality

b) Quantity Issues

- i. Total daily amount used acceptable.
- ii. Rate of delivery can be a problem.
  - 15 emitters at 20 gal/hr need 5 gpm system.
  - 40 emitters at 20 gal/hr need 13.3 gpm system.



# Sprinkler Systems

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## 4. Operation and Management

- Operate at all temperatures above 80 °F except holding pen.
- Wet cows then allow to dry.
- 1 to 5 minute “on time” with 15 to 45+ minutes off time.
- Use 24-hour timer to turn off at night (desire is allow floor to dry).

# Questions or Discussion

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