Heat stress abatement: Prevention is the cure  
Chris Reinhardt, extension feedlot specialist

Summer is upon us and is promising some record temperatures and heat conditions across the Midwest, and we’re just coming into the time of greatest concern for heat stress. As beef producers and those of us who support the beef industry, it’s our duty to prepare for all the possible contingencies that summer weather can bring. So, that being said, what are the tools we have in our toolbox to be better prepared to deal with the heat?

1. Pasture cattle fare better than confined cattle during heat events, provided that they can find adequate shade, elevated areas to catch more breeze, and abundant water quality and quantity to alleviate heat stress during the hottest times of the day.

2. Black-hided cattle sustain the greatest challenge due to absorption of more solar radiation compared to light-hided cattle, and the problem is exacerbated in heavy, long-fed cattle. Heat stress is caused by the combination of actual temperature, high humidity, lack of wind, and lack of cloud cover.

3. Shade works. Keeping solar radiation to a minimum during extreme heat events may eliminate the need for emergency intervention. Even some kind of temporary or portable shade structures which can be placed in pens prior to extreme heat events will give cattle relief and get you through the worst heat episodes.

4. Wind breaks contribute to heat stress. Even if no extreme heat stress may be evident, reducing potentially cooling breezes can make cattle less likely to consume and perform up to their full potential. If wind breaks are needed for the winter, consider some form of temporary wind break which can be removed for the summer months.

5. Building mounds isn’t just for wet, muddy conditions. Cattle will climb mounds for improved access to breezes. Cattle don’t lie: if they’re using shades and using mounds, they are probably more comfortable because of the mounds and the shades.

6. Extra drinking water space may provide comfort and alleviate the demand on the water system during peak heat hours. Remember: cattle cool themselves through evaporative cooling from their lungs and this can move a tremendous volume of water which needs to be replaced. Extra water space can be in the form of steel tanks or even feed bunks with tarps and sand bags on the ends to convert part of the bunk to an extended water tank. Not only is water volume the issue, but linear access space is also critical because dominant cattle may simply stand at the water trough to breathe the cooler air directly above the water source, preventing smaller or more timid cattle from getting a needed drink. Extra tanks provide both volume and linear access space.

7. Bedding a portion of the pen with straw or light-colored hay provides a reflective surface to provide cattle a cooler place to lie down and rest, thus reducing their activity and improving comfort during already stressful conditions.

8. Sprinkling cattle may be essential during extreme heat events. Spraying cattle is continued...see Heat Stress on page 5
**Tally Time – Counting Flies**  
*Sandy Johnson, livestock specialist*

Horn flies represent the single largest cause of losses in cattle production due to external parasites. The total loss was estimated to be $1.36 billion in 2012. Failing to control flies in growing calves roughly reduces gain 1.5 lbs per week. At today’s calf prices, fly control is a good investment. Animals in poor body condition will suffer injury at a lower fly population than those in good body condition.

With the exception of feeding insect growth regulators (IGRs), other forms of fly control should be delayed until fly numbers reach levels where it makes economic sense to control them, by most estimates 200 flies per animal. The delay is recommended to help reduce the development of resistance by reducing the generations of flies that are exposed to the treatment (30-35 generations per season for horn flies). Removing fly tags and other forms of treatment late in the season is another necessary part of managing resistance.

If you’ve ever tried to count flies yourself you might find it a bit challenging. Technology has made it much easier for researchers to document fly numbers by using a camera and a software program. We can use some of these observations to help us get a better mental image of how many flies are present. The figures below show cows with 145 (A), 247 (B), 314 (C) and 536 (D) flies per side, notice you see evidence of slobber trails on several of these cows. Cattle tossing their heads fighting flies are not eating.

If you find the flies hard to see in images in the newsletter, the same pictures can be viewed online at [http://livestockbugs.okstate.edu/horn-flies](http://livestockbugs.okstate.edu/horn-flies) in the 2012 report by Justin Tally, entomologist for Oklahoma State University with his annual report of studies comparing commercial ear tags. You will also find a listing of what class of compound is contained in various fly tags to help ensure you get needed rotation.

The recommendation is to only use pyrethroid tags once every 3 years and not use organophosphate tags more than 2 years in a row. If fly control methods are not working, do not retag cattle regardless of insecticide class. Rather switch to a different chemistry and try sprays, pour-ons, dusts or backrubbers. If possible, alternate insecticide classes when changing control methods. Generally most fly tags will be effective for about 2.5 months. The goal should not be to eliminate all flies rather it should be to keep them under the level at which they cause economic harm.
The prevalence of drought conditions across much of Kansas and the Great Plains in recent years has re-
newed interest in the use of anhydrous ammonia to improve the feeding value of low quality forages such as
wheat straw. An application of 3.0% anhydrous ammonia (60 lbs/ton) on a dry matter basis has traditionally
been recommended. However, a demonstration project conducted by the K-State Beef Extension team at 6
locations across the state in 2012, indicated that an anhydrous ammonia application rate of 1.5% (30 lbs/ton;
dry weight basis) resulted in a proportionally greater improvement in forage quality than the recommended
3.0% application rate.

A cow feeding study, based on the results of that case study, was recently conducted at the Agricultural Re-
search Center in Hays during the Fall of 2013. The objective of this study was to evaluate the inclusion of
wheat straw treated with 1.5% or 3.0% anhydrous ammonia (dry basis) in diets containing wet distillers grain
limit fed (1.9% of bodyweight, dry matter basis) to spring-calving beef cows for 84 days on cow bodyweight,
average daily gain and body condition score. Three treatment diets were fed: 1) 64.1% wheat straw (CON); 2)
64.1% wheat straw treated with 1.5% (weight/weight) anhydrous ammonia (1.5A); 3) 64.1% wheat straw
treated with 3.0% (weight/weight) anhydrous ammonia (3.0A). See Table 1 for nutrient composition.

The results of this study are summarized in Table 2 (page 4). Cows fed diets containing wheat straw treated
with anhydrous ammonia resulted in greater bodyweight gain, average daily gain and tended to result in better
body condition scores at the conclusion of the feeding period. Collectively, the results of this study indicate

continued...see Ammoniated Wheat Straw on page 4

Table 1. Ingredient and nutrient composition of diets containing wheat straw treated
with 0.0% (control), 1.5% or 3.0% anhydrous ammonia (wt/wt; DM basis).

<table>
<thead>
<tr>
<th>Item</th>
<th>CON</th>
<th>1.5A</th>
<th>3.0A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingredient composition, % DM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground, wheat straw-CON</td>
<td>64.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ground, wheat straw-1.5%</td>
<td>-</td>
<td>64.1</td>
<td>-</td>
</tr>
<tr>
<td>Ground, wheat straw-3.0%</td>
<td>-</td>
<td>-</td>
<td>64.1</td>
</tr>
<tr>
<td>Wet distillers grain</td>
<td>19.9</td>
<td>19.9</td>
<td>19.9</td>
</tr>
<tr>
<td>Rolled sorghum</td>
<td>14.9</td>
<td>14.9</td>
<td>14.9</td>
</tr>
<tr>
<td>Calcium carbonate</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Salt</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Vitamins and mineral premix</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nutrient composition, DM basis</th>
<th>CON</th>
<th>1.5A</th>
<th>3.0A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Protein, %</td>
<td>11.8</td>
<td>14.9</td>
<td>16.2</td>
</tr>
<tr>
<td>Neutral Detergent Fiber, %</td>
<td>44.51</td>
<td>42.59</td>
<td>42.05</td>
</tr>
<tr>
<td>Acid Detergent Fiber, %</td>
<td>34.20</td>
<td>35.25</td>
<td>35.24</td>
</tr>
<tr>
<td>Calcium, %</td>
<td>0.99</td>
<td>0.94</td>
<td>0.90</td>
</tr>
<tr>
<td>Phosphorus, %</td>
<td>0.30</td>
<td>0.29</td>
<td>0.30</td>
</tr>
<tr>
<td>Sulfur, %</td>
<td>0.29</td>
<td>0.27</td>
<td>0.31</td>
</tr>
</tbody>
</table>

1Treatments: CON = 64.1% wheat straw (no anhydrous ammonia); 1.5A = diet containing 64.1% wheat straw previously treated with
1.5% (wt/wt) anhydrous ammonia; 3.0A = diet containing 64.1% wheat straw previously treated with 3.0% (wt/wt) anhydrous ammonia
2Premix supplied 150 mg head⁻¹d⁻¹ Rumensin®
3Nutrient analysis conducted by SDK Labs, Hutchinson, KS

64.1% wheat straw treated with 1.5% (weight/weight) anhydrous ammonia (1.5A); 3) 64.1% wheat straw
treated with 3.0% (weight/weight) anhydrous ammonia (3.0A). See Table 1 for nutrient composition.

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July 2014
Ammoniated Wheat Straw  
continued from page 3

that the performance of pregnant beef cows may be improved by applying anhydrous ammonia to low quality forages, such as wheat straw, at a rate as low as 1.5% (dry weight). Additionally, these improvements in cow performance were observed in diets

Table 2. Performance of pregnant beef cows diets containing wheat straw treated with 0.0% (Control), 1.5% or 3.0% anhydrous ammonia on (wt/wt; DM basis) for 84 days.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>CON</th>
<th>1.5A</th>
<th>3.0A</th>
<th>SEM</th>
<th>$P_{-}$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pens</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body wt</td>
<td>1265</td>
<td>1239</td>
<td>1245</td>
<td>16.6</td>
<td>0.51</td>
</tr>
<tr>
<td>Final, lb</td>
<td>1395</td>
<td>1399</td>
<td>1408</td>
<td>19.6</td>
<td>0.89</td>
</tr>
<tr>
<td>Total gain, lb*</td>
<td>130a</td>
<td>160b</td>
<td>163b</td>
<td>3.9</td>
<td>0.01</td>
</tr>
<tr>
<td>ADG, lb/d*</td>
<td>1.35a</td>
<td>1.66b</td>
<td>1.69b</td>
<td>0.09</td>
<td>0.01</td>
</tr>
<tr>
<td>BCS</td>
<td>5.86</td>
<td>5.87</td>
<td>5.92</td>
<td>0.07</td>
<td>0.78</td>
</tr>
<tr>
<td>Change</td>
<td>0.00</td>
<td>0.08</td>
<td>0.16</td>
<td>0.04</td>
<td>0.13</td>
</tr>
</tbody>
</table>

1Treatment consisted of 3 diets, limit-fed at 1.9% initial BW (DM basis) 1) CON = 64.1% wheat straw diet (no anhydrous ammonia); 2) 1.5A = diet containing 64.1% wheat straw previously treated with 1.5% (wt/wt) anhydrous ammonia; 3) 3.0A = diet containing 64.1% wheat straw previously treated with 3.0% (wt/wt) anhydrous ammonia

2To account for differences in gut fill, cows were fed a common diet prior to collection of initial weight and were fed a common diet for 12 d prior to collection of final weight. Thus calculation of ADG is based on 96 days on feed.

3BCS scale: 1 to 9 (1=emaciated, 9=obese; Wagner et al., 1988)

4Within a row, means without a common superscript differ ($P_{-} \leq 0.05$)

* Linear $P_{-} = 0.01$, Quadratic $P_{-} = 0.10$

...application of 1.5% anhydrous ammonia (dry weight) may be more economical when anhydrous ammonia prices are relatively high.
Heat Stress .... continued from page 1

costly, time-consuming, and can contribute to increased mud and humidity within the pen, but it also may be the difference between life and death for extremely heat-stressed cattle. Be hyper-vigilant for signs of extreme heat distress: open mouthed, labored, panting. Both cattle surface temperature and soil surface temperature are reduced as a result of spraying water which then evaporates, taking heat out of the surface. Have a full water truck on hand when the forecast calls for elevated temps, high humidity, minimal wind, and lack of cloud cover.

As summer heat comes at us, we all need to be prepared. Shade, extra water space, mounds to elevate cattle to catch extra breeze, and removal of wind breaks can help cattle effectively alleviate heat stress. Preparation is much more effective at reducing the costs of heat stress than interventions after extreme heat stress is obvious.

Hollis Retires

Beef Tips introduced you to Dr. Larry Hollis in September of 2002 as beef extension veterinarian. He joined K-State after several years working in industry and at other academic institutions. Since then he has been an active and valued member of the extension beef team and the Animal Sciences and Industry Department. He plans to retire on July 5, 2014. We thank him for his valued service to the university and the industry. He and his wife, Shirley, plan to move to Texas where they can be closer to grandchildren and Larry can teach them to fish.

Other resources on Heat Stress

Heat Stress — What You Should Know to Make Livestock Shows a Success
UNL Extension G2121- http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=1448

APPS

ThermalAid — This app is a decision-making tool for users to identify, monitor, and reduce heat stress in cattle to improve welfare and performance.

Heat Stress — The Heat Stress in Livestock and Poultry App allows the producer to calculate heat stress based on the measured barn temperature and relative humidity.

QualiTech Heat Stress Web APP — Sends email alerts when temperature and humidity indexes reach levels that cause stress. http://www.qualitechco.com/ANEVIS
The 2014 K-State Beef Conference will feature six face-to-face meetings around the state of Kansas over the August 11-14, 2014 time frame. The goal of the meeting is for extension expertise to interface with profit minded cow-calf producers on a range of timely and economically impactful topics. This year’s program is titled: Busting Myths that Affect Your Bottom Line (see list of tentative topics below). State extension educators and collaborating district and county based extension experts will provide a fast paced program that will get to the heart of a number of common myths that are robbing profit from cow-calf producers’ bottom lines. Speakers will include state extension specialists Drs. Jaymelynn Farney, Dale Blasi, Charlie Lee, Sandy Johnson, Chris Reinhardt, Justin Waggoner, and Bob Weaber.

It is important for producers to not rest on the expected wide margin of profit due to today’s high calf prices. Rather producers should be energized to seek out and capture profits left on the table.

Registrations should be completed with the hosting county/district office. Registrations will vary depending on site location but will be kept to a minimum to encourage attendance. All sites will feature a meal which will be included in registration costs. To aid in the judicious use of funding resources, a minimum of 40 attendees at each site is requested. For more information see www.ksubeef.org and see information on ‘K-State Beef Conference.’

Dates and locations
- Aug. 11, 2014, 5 - 9 PM, Erie hosted by Southwind and Wildcat Extension Districts
- Aug. 12, 2014, 9 AM - 1 PM, El Dorado hosted by Butler, Cowley, Sedgwick Co. Ext. and Rolling Prairie, Flint Hills Ext. Districts
- Aug. 12, 2014, 5 - 9 PM, Pratt, hosted by Barber County Extension
- Aug. 13, 2014, 5 - 9 PM, Newton, hosted by Harvey, Marion, and McPherson County Extension
- Aug. 14, 2014, 9 AM - 1 PM, Oakley, Golden Prairie Extension District
- Aug. 14, 2014, 5 - 9 PM, Salina, Central Kansas, Post Rock, River Valley and Midway Extension Districts

Tentative list of myths that will get busted:
- Trichomoniasis is a regulatory problem
- Antibiotic restrictions won’t affect me
- Operation is too small for a planned breeding program
- Record keeping has to be complicated
- I don’t need to body condition score my cows
- Producers need 1,400 lb cows to make 1,400 lb fed steers
- I can change a trait without affecting others
- Heterosis isn’t important in today’s beef business
- All info in a bull sale catalog is important… a bull’s actual birth weight is a good selection tool
- Anything with a uterus is a replacement
- Ionophores (Rumensin or Bovatec) are too expensive to be practical in my operation
- The only beef consumer worth focusing on is the one that goes to a white table cloth restaurant
- I don’t need to pay attention to wildlife/endangered species on my property