Evaluation of hair shedding scores in relation to maternal traits and productivity in beef cattle

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Introduction

Long, thick and dark hair coats improve conservation and maintenance of body heat (Gray et al., 2011). However, during periods of high temperatures and humidity, cattle are susceptible to heat stress. If cattle overheat, issues with decreased fertility, milk production, and growth can occur (Bilby et al., 2008). Cattle dissipate heat mainly through evaporative cooling during respiration and through sweating. Heat dissipation is essential to maintaining normal production and to lessen the chance of heat stress. Elevated environmental temperatures could negatively affect cattle with thick, wooly coats drastically more than those with slick, short summer coats. In the sub-tropical climate of the southeastern United States, cattle that do not shed their winter coat efficiently exhibit signs of impaired production traits such as reduced calf weaning weights likely due to heat stress (Gray et al., 2011).

The objectives of this study was to measure the rate at which cattle shed their winter coat in the warm, humid climate of Arkansas, and to determine if any relationship existed between production parameters and coat shedding activity.

Materials and Methods

Angus crossbred cows and heifers (n = 199) were used for this study. Cattle were located at the University of Arkansas’ beef cattle research unit near Savoy, Ark. Observations were made on the study animals from March through July of 2012. Cows ranged from 2 to 16 years of age. All mature cows weaned a calf in May 2012, and if pregnant, were scheduled to calve during the fall of 2012 and rebreeding began in November 2012. Phenotypic traits collected included cow body weight at weaning, body condition score (BCS; Richards et al., 1986) at weaning, cow body weight at pre-breeding, BCS at pre-breeding, pregnancy rate, calf birth weight and calf weaning weight.

Hair shedding scores were collected monthly by a trained panel of university faculty and staff based on a 1 to 5 coat shedding scale (Table 1) adapted from Gray et al. (2011). The first month a score of 3 (50% shed) or less was reached was considered the month of first shedding (MFS). Data including calf weaning weight, body condition score (BCS) of cow at weaning, body weight (BW) of cow at weaning, BCS of cow pre-breeding, BW of cow pre-breeding, pregnancy rate, birth weight of calf and age of the cow were collected and analyzed in PROC MIXED and FREQ of SAS. Frequency for MFS was highest for June, followed by May, July and April, respectively. Calf birth weight was highest (P = 0.015) for cows exhibiting MFS in May and lowest for cows exhibiting MFS in July. Calf weaning weight was similar (P = 0.8) among MFS categories with April, May, June and July cows exhibiting calf weaning weights of 493, 471, 471 and 455 lb, respectively. Cow body weight at weaning was highest (P = 0.05) in cows exhibiting MFS in May (1193 lb) and lowest in cows with MFS in June (1046 lb). No differences were noted in BCS of cows at weaning or in BCS of cows pre-breeding. Cow body weight at pre-breeding was highest (P = 0.01) for cows exhibiting MFS in May (1185 lb) and lowest in cows with MFS in June (960 lb). In these data, shedding of winter hair coats were related to maternal body weight at two different points during production as well as related to calf birth weight.

Results and Discussion

As temperatures increased during spring and summer months, cattle began shedding of winter hair coats. In March, all cattle maintained a winter coats and shedding score of 5, however, by July study animals had all displayed a shedding score of ≤3. Figure 1 displays percent of cows exhibiting a hair shedding score of ≤3× month.

Age and MFS exhibited a significant relationship (P ≤ 0.05; Fig. 2). Average age of cows reaching MFS was 3.75, 7.5, 5.2, and 2.7 years for April, May, June, and July, respectively. Cow body weight at weaning was highest (P = 0.05; Fig. 3) in cows exhibiting MFS in May (1193 lb) and lowest in cows with MFS in June (1046 lb). No differences were noted in BCS of cows at weaning (P = 0.44; Fig. 4) or in BCS of cows pre-breeding (P = 0.97; Fig. 6). Cow BW at pre-breeding was highest (P = 0.01; Fig. 5) for cows exhibiting MFS in May (1185 lb) and lowest in cows with MFS in June (960 lb). Shedding of the winter hair coats were noted to be related to maternal BW at two different points during the production and year, and cow body weight was closely associated with the age of the cows with 2 and 3 year old cows exhibiting lighter BW compared to older cows. Pregnancy rates were similar (P = 0.21) for all MFS categories with April, May, June and July groups exhibiting pregnancy rates of 75, 100, 81 and 100 percent, respectively.
Calf birth weight was highest ($P = 0.015$; Fig. 7) for cows exhibiting MFS in May and lowest for cows exhibiting MFS in July at 82.6 and 66.8 pounds, respectively. Calf weaning weight was similar ($P = 0.8$; Fig. 8) for all MFS categories.

**Implications**

Winter hair coat shedding for the study herd occurred over a four-month period between April and July with the bulk of the animals shedding in June. Month that shedding scores reached 3 or lower was associated with cow body weight at weaning, cow body weight pre-breeding and calf birth weight. Additional research is needed to confirm the relationship between hair coat shedding score and these phenotypic data, and possible mechanisms governing that association.

**Table 1. Hair coat shedding score scale.**

<table>
<thead>
<tr>
<th>Hair coat shedding score</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>5</td>
<td>Thick winter coat (0% shed)</td>
</tr>
<tr>
<td>4</td>
<td>Shedding has begun (25% shed)</td>
</tr>
<tr>
<td>3</td>
<td>Half of shedding is complete (50% shed)</td>
</tr>
<tr>
<td>2</td>
<td>Most of shedding is complete (75% shed)</td>
</tr>
<tr>
<td>1</td>
<td>Slick summer coat (100% shed)</td>
</tr>
</tbody>
</table>

**Literature Cited**


![Fig. 1. Percentage of cattle reaching month of first shedding score by month.](chart)
Figure 2. Cow age by month of first shedding.

- **Least-squares means with differing superscripts differ.**

Fig. 2. Cow age by month of first shedding.

Figure 3. Cow weight at weaning by month of first shedding.

- **Least-squares means with differing superscripts differ.**

Fig. 3. Cow weight at weaning by month of first shedding.
**Fig. 4.** Cow BCS at weaning by month of first shedding.

**Fig. 5.** Cow body weight pre-breeding by month of first shedding.

**Least-squares means with differing superscripts differ.**
Figure 6. Cow BCS pre-breeding by month of first shedding.

Fig. 6. Cow BCS pre-breeding by month of first shedding.

Figure 7. Calf birth weight by month of first shedding.

Fig. 7. Calf birth weight by month of first shedding.

**Least-squares means with differing superscripts differ.**
Fig. 8. Calf weaning weight by month of first shedding.