EFFECT OF CALF WEANING AGE AND COW SUPPLEMENTATION ON COW PRODUCTIVITY

F. M. Pate, J. R. Crockett and J. D. Phillips

University of Florida,
Everglades Research and Education Center,
Belle Glade, FL 33430

ABSTRACT

Five years of data were collected on 124 Brangus-type cows to evaluate weaning calves at 8.5 or 10.5 mo of age and winter supplementation of the brood cow with 2.25 kg of molasses daily. Cows with calves weaned at 10.5 mo of age gained 14 kg less weight (P<.01) during the late nursing period than did cows from which calves were earlier weaned. Age of calf at weaning had no effect on cow reproduction, but calves weaned at 10.5 mo were 2 to 3 d younger (P<.06) and 5.3 kg lighter (P<.05) at 8.5 mo of age. During the last 2 mo of nursing, calves weaned at 10.5 mo of age gained 37.2 kg and had a 31.9-kg heavier weaning weight than calves weaned at 8.5 mo of age.

Molasses supplementation resulted in differences (P<.01) in cow weight changes. Cows fed molasses had calving percentages 5 to 7 units higher (P<.30) than cows not fed molasses. Feeding cows molasses for 145 d throughout the calving and breeding season increased calf weaning weight 7.7 (P<.02) and 11.2 (P<.03) kg, respectively, at 8.5 and 10.5 mo of age over the nonsupplemented controls.

(Key Words: Calves, Weaning, Molasses, Feed Supplements, Production, Reproduction.)

Introduction

Weaning calves at 6 to 8 mo of age has been a standard management practice in the U.S. This practice probably traces to the seasonal management of the cow herd relative to forage production in the temperate regions. In Virginia, weaning records of Angus, Hereford and Shorthorn commercial herds showed that rate of gain of nursing calves sharply declined after 240 d of age, a response attributed to the end of lactation, poorer grazing conditions and natural weaning before weighing (Marlowe and Gaines, 1958).

Calf growth records from crossbreeding studies at the Everglades Research Center showed that breed affected growth rate of calves during late lactation (Crockett, 1977). Brahman and Brahman crossbred calves gained .75 kg daily between 7 and 9 mo of age, while Angus and Hereford calves gained .39 and .48 kg daily, respectively.

Beef producers in the subtropics and tropics might benefit from weaning calves at a later age by utilizing a combination of Brahman breeding and a longer forage growing season. A longer calf nursing period may also have application in temperate regions, particularly where fall calving is practiced. Little is known about the effects of late nursing on the subsequent production of the cow. This study was conducted to compare the long-term production of cows with calves weaned at 10.5 or 8.5 mo of age each year. A second objective was to evaluate molasses as a winter supplement for brood cows.

Experimental Procedure

One hundred twenty-four Brangus-type cows were randomly assigned by breed and age to five groups of 20 cows each and one group of 24 cows. One-half of the cows were purebred Brangus and one-half F1 Angus × Brahman crosses. Brangus and F1 cows were obtained from a breeding project at the Everglades Research Center. The F1 cows were produced from purebred Angus dams bred to purebred Brahman bulls. Ten cows in each group (12 in group with 24) were designated to have their calves weaned each year at an average age of 8.5
mo and the remaining cows were designated to have their calves weaned at an average age of 10.5 mo.

Cows were grazed year-round on Roselawn St. Augustine grass (Stenotaphrum secundatum) grown on an organic soil (sawgrass peat, 95% organic matter) at a stocking rate of 3.1 cows/ha. Mineral mix and water were available free-choice at all times. Two groups of cows were not supplemented during the winter, two groups were fed 2.25 kg/head daily of straight millrun blackstrap molasses (IFN 4-13-251) for 85 d, which included the breeding season, and two groups were fed 2.25 kg/head daily of molasses for 145 d, which included both calving and breeding seasons. Molasses feeding was started on December 15 or October 15 and ended at the end of the breeding season (March 10). Molasses was fed twice weekly in open troughs.

The breeding season was 70 d beginning January 1. During the breeding period, Brangus and F1 cows were separated and bred to Brangus and F1 Angus x Brahman bulls, respectively. Brangus and F1 bulls were obtained from unrelated herds in Florida and Texas.

Cows were palpated for pregnancy (palpation percentage) on July 15 each year. Cows were weighed on December 15, March 10, July 15 and September 15. From these data, cow body weight changes were calculated for: 1) from 10.5-mo weaning to start of breeding season; 2) the breeding season; 3) from end of breeding season to the 8.5-mo weaning and 4) from 8.5-mo weaning to 10.5-mo weaning. A visual condition score was assigned to each cow at each weighing by a single scorer. The scoring system ranged from 1 to 9, with 1 = very thin, 5 = average and 9 = very fat.

All unpregnant and unsound cows were culled from the herd; low-producing cows were culled depending on the availability of replacement heifers. Selection of replacement heifers was based on weaning weight and grade, post-weaning growth, and soundness. Heifers were placed in the breeding herd as 2-yr-olds immediately before the breeding season.

Results and Discussion

There were no significant interactions between calf weaning age and molasses supplementation treatments, nor were there interactions between these two variables and breed of animal.

Cows nursing calves between July 15 and September 15 gained 15 kg less weight (P<.01) than did cows from which calves were already weaned (table 1). Overall weight change of cows in both calf weaning age treatments was not significant, therefore cows that weaned 10.5-mo calves compensated during other periods of the year for lower weight gain during the July 15 to September 15 period. The condition of cows in both calf weaning age treatments was similar and cows were never extremely thin at any time during the year.

Calf data are presented for all calves born and for calves from cows that weaned a calf the previous year (table 2). The latter data more accurately defines the effect of a late weaning
<table>
<thead>
<tr>
<th>Item</th>
<th>Weaning age of calf, mo \textsuperscript{a}</th>
<th>Molasses supplementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.5</td>
<td>10.5</td>
</tr>
<tr>
<td>Number of observations</td>
<td>291</td>
<td>291</td>
</tr>
<tr>
<td>Average weight on</td>
<td>473 ± 3</td>
<td>465 ± 3</td>
</tr>
<tr>
<td>September 15, kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight change, kg</td>
<td>-10 ± 2</td>
<td>-7 ± 2</td>
</tr>
<tr>
<td>Sept. 15 to Dec. 15</td>
<td>-39 ± 1</td>
<td>-38 ± 1</td>
</tr>
<tr>
<td>Dec. 15 to March 10</td>
<td>27 ± 1</td>
<td>32 ± 1</td>
</tr>
<tr>
<td>March 10 to July 15</td>
<td>44 ± 1\textsuperscript{b}</td>
<td>30 ± 1\textsuperscript{c}</td>
</tr>
<tr>
<td>July 15 to Sept. 15</td>
<td>22 ± 1</td>
<td>17 ± 1</td>
</tr>
<tr>
<td>Annual change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow condition score\textsuperscript{d}</td>
<td>7.3 ± .2</td>
<td>7.2 ± .2</td>
</tr>
<tr>
<td>Sept. 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec. 15</td>
<td>7.2 ± .2</td>
<td>7.0 ± .2</td>
</tr>
<tr>
<td>March 10</td>
<td>4.7 ± .2</td>
<td>4.6 ± .2</td>
</tr>
<tr>
<td>July 15</td>
<td>6.7 ± .2</td>
<td>6.7 ± .2</td>
</tr>
<tr>
<td>Palpation percentage, %\textsuperscript{e}</td>
<td>88.3 ± 1.9</td>
<td>89.0 ± 1.9</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Weaning dates were July 15 and September 15, respectively.

\textsuperscript{b,c}Means with different superscripts differ (P<.01).

\textsuperscript{d}Condition score 1 to 9, with 1 = very thin, 5 = average and 9 = very fat.

\textsuperscript{e}Calculated as: (number of cows palpated as pregnant/number of cows exposed to bull) × 100.
<table>
<thead>
<tr>
<th>Item</th>
<th>Weaning age of calf, mo&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Molasses supplementation</th>
<th>Calving and breeding season</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.5</td>
<td>10.5</td>
<td>None</td>
</tr>
<tr>
<td>All calves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number born</td>
<td>257</td>
<td>259</td>
<td>162</td>
</tr>
<tr>
<td>Birth day&lt;sup&gt;b&lt;/sup&gt;</td>
<td>303.9 ± 1.1</td>
<td>306.7 ± 1.0</td>
<td>305.8 ± 1.4</td>
</tr>
<tr>
<td>Birth weight, kg</td>
<td>28.7 ± 0.3</td>
<td>28.2 ± 0.3</td>
<td>28.7 ± 0.4</td>
</tr>
<tr>
<td>Weight at 8.5 mo of age, kg</td>
<td>222.5 ± 1.9&lt;sup&gt;c&lt;/sup&gt;</td>
<td>217.2 ± 1.8&lt;sup&gt;d&lt;/sup&gt;</td>
<td>217.2 ± 2.4&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Weight at 10.5 mo of age, kg</td>
<td>254.4 ± 2.1</td>
<td>251.0 ± 3.6&lt;sup&gt;c&lt;/sup&gt;</td>
<td>250.1 ± 3.4&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td>Death losses, %</td>
<td>7.2 ± 0.7</td>
<td>7.2 ± 0.7</td>
<td>8.4 ± 0.8</td>
</tr>
<tr>
<td>Weaning rate, %&lt;sup&gt;c&lt;/sup&gt;</td>
<td>80.8 ± 1.8</td>
<td>81.8 ± 1.8</td>
<td>77.2 ± 2.2</td>
</tr>
<tr>
<td>Calf production/cow, kg&lt;sup&gt;e&lt;/sup&gt;</td>
<td>179.8</td>
<td>208.1</td>
<td>193.8</td>
</tr>
<tr>
<td>Calves from cows that weaned calf previous year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of calves</td>
<td>150</td>
<td>154</td>
<td>91</td>
</tr>
<tr>
<td>Birth day&lt;sup&gt;b&lt;/sup&gt;</td>
<td>302.6 ± 1.3</td>
<td>304.7 ± 1.2</td>
<td>305.0 ± 1.6&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Weight at 8.5 mo of age, kg</td>
<td>219.6 ± 2.2&lt;sup&gt;c&lt;/sup&gt;</td>
<td>213.0 ± 2.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>211.9 ± 2.8&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Weight at 10.5 mo of age, kg</td>
<td>246.2 ± 2.4</td>
<td>240.2 ± 4.4&lt;sup&gt;c&lt;/sup&gt;</td>
<td>240.4 ± 3.9&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> Weaning dates were July 15 and September 15, respectively.

<sup>b</sup> Day of year from January 1 (November 1 = 305).

<sup>c</sup>,<sup>d</sup> Means within weaning age or molasses supplementation treatments with different superscripts differ (P<.05).

<sup>e</sup> Based on number of cows exposed to bull. Calf production/cow = calf weaning weight X (calf weaning percent/100).
age on calf performance because only data for
cows that actually weaned a calf the previous
year were used. Calf weaning age did not
greatly affect birth date or birth weight, al-
though average birth date was 2 to 3 d later
(P<.06) for calves in the 10.5-mo weaning age
treatment.

Calves in the 10.5-mo weaning age treatment
weighed less (P<.05) at 8.5 mo than calves that
were weaned at 8.5 mo. The mean difference
was 5.3 kg (P<.05) when all calves were averaged
and 6.6 kg (P<.04) when using only data for
calves from cows that weaned a calf in the
respective weaning age treatment the previous
year. The lighter weight of 10.5-mo calves was
mostly due to their 2- to 3-d later birth date
(P<.06). The effect of calf weaning age on the
8.5-mo weight was very obvious from annual
records. For the first year, in which cows had
not been previously subjected to a difference in
calf weaning age, calves to be weaned at 10.5
mo of age were 1.1 kg heavier at 8.5 mo than
were calves weaned at this time. During the 4
subsequent yr, calves from cows that weaned a
calf at 10.5 mo of age the previous year were
15.0, 2.0, 5.3 and 5.5 kg lighter, respectively, at
the 8.5-mo weaning time than were calves from
cows that weaned a calf at 8.5 mo the previous
year.

Calves weaned at 10.5 mo of age gained 37.2
kg during the additional 2 mo of nursing and
their weaning weight was 31.9 kg heavier than
weaning weights of calves weaned at 8.5 mo of
age. Although total gain by calves was relatively
good during this late nursing period, rate of
gain was approximately 20% slower than during
the previous 8.5 mo, indicating that calf per-
formance was affected by the extended nursing
period. This could be attributed to a declining
milk production of the cow or to the declining
quality of St. Augustinegrass forage, which
averaged 58% TDN from April thru June and
53% TDN from July thru September (Pate et
al., 1980). Calf death losses were unaffected by
calf weaning age.

It is concluded that calves can be left with
 cows for up to 10.5 mo of age to obtain a
 sizeable advantage in calf weaning weight
without affecting long-term reproduction of the
cow. A long nursing period is not recommended
as a standard management practice, but as a
management tool to be employed by cow-calf
producers in relation to forage availability,
condition of the brood cow herd and existing
or predicted feeder calf prices.

Molasses was evaluated strictly as an energy
supplement because pasture forage grown on
the organic soil area of south Florida during the
winter contains at least 13% crude protein (Pate
et al., 1980) and molasses produced in south
Florida contains more than 7% crude protein
(Pate, 1983). Molasses supplementation sig-
nificantly influenced cow body weight changes
throughout the year (table 1). During the
December 15 to March 10 period (included
breeding season), when forage growth and
availability was most reduced, cows in both
treatments being fed molasses lost less weight
(P<.01) than did cows not fed molasses. Cow
weight changes during the spring and summer
tended to be similar for all supplementation
treatments.

Cows that never received molasses gained
more weight (P<.01) from July 15 to September
15 than cows in both molasses supplementation
treatments, and lost less weight (P<.01) from
September 15 to December 15 than cows fed
molasses only during the breeding season.
Apparently cows that were never fed molasses
were compensating for larger weight loss during
the previous winter breeding period. Feeding
cows molasses during the September 15 to
December 15 period prevented the weight loss
exhibited by cows fed molasses during the
breeding season but not during this period.
Weight losses from September 15 to December
15 appeared small for cows in all treatments
considering that they calved during this period,
probably because an adequate quantity of
relatively good quality forage (13% crude
protein, 53% TDN) was available during this
period (Pate et al., 1980).

Condition scores (table 1) for cows in
molasses supplementation treatments were not
statistically different at any time during the
year. They do reflect the good condition of
cows going into the winter period, which may
have moderated the effects of molasses supple-
mentation.

Palpation percentage of cows tended to
increase (P<.30) as the quantity of molasses fed
increased. Cows fed molasses during the breeding
season and during the calving plus breeding
season had 3.6 and 5.0 higher palpation per-
centages, respectively, than did cows not fed
molasses. Although the probability of these
differences being due to chance was relatively
large, these results are supported by a previous
4-yr study at the Everglades Research Center
(Chapman et al., 1965) that showed that the
Palpation percentage of brood cows fed 2.25 kg of molasses daily during the winter calving and breeding season was 7 percentage points higher than for cows not fed molasses. Further analysis of these data (Crockett, 1977) suggested that molasses supplementation benefited only straightbred Brahman, Hereford and Angus cows, but not crossbred cows of these breeds. A similar breed effect in response to molasses supplementation was not evident in the present study.

Average calf birth date as affected by molasses supplementation treatments approached significance (P<.06) but differences were not large. The similar birth dates indicated that molasses feeding did not affect time of re-breeding, which would suggest that it did not affect reproduction.

Calves nursing cows that were supplemented with molasses during the calving and breeding season were about 7 kg heavier (P<.03) at 8.5 mo of age than were calves from cows not fed molasses or fed molasses only during the breeding season (table 2). Calves in the 10.5-mo weaning group that were raised by cows fed molasses during the calving and breeding season were 10 and 14 kg heavier (P<.03) than calves nursing cows fed molasses during the breeding season or cows not fed molasses, respectively. In a previous study (Chapman et al., 1965), seasonal feeding of molasses (135 d) to brood cows increased average calf weaning weight 14.5 kg over calves nursing cows that were not supplemented with molasses.

Although not significant, calf death losses were lower in the treatment in which molasses was fed only during the breeding season. Percentage of cows weaning calves was 6.8 and 5.7 percentage points higher (P<.30) for cows fed molasses during the breeding season or calving plus breeding season, respectively, than for cows not fed molasses. Chapman et al. (1965) reported that seasonal molasses supplementation of the brood cow did not appear to influence calf survival, but noticeably improved calf weaning percentage.

In terms of total production (weaning weight × weaning percentage), the later weaning age increased calf weaning weight 28.3 kg/cow in the breeding herd (table 2). For the late-weaned calves, molasses supplementation during the breeding season or calving plus breeding season increased calf weaning weight 16.2 and 23.6 kg/cow in the breeding herd, respectively, over cows not fed molasses. A later calf weaning age and molasses supplementation of the brood cow offers significant advantages in cow-calf production that should be of economic importance.

**Literature Cited**


