Maternal Behaviour of Beef Cows: Can we Exploit it?

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What is Maternal Behaviour?

It basically represents the mother’s willingness to invest her time, energy and resources into the successful rearing and protection of her young.
When does maternal behaviour begin and how long does it last?

Mammalian show signs of maternal behaviour starting before birth and continuing beyond weaning.
Which of these species isolates themselves from herd mates during calving?
Relative interest and investment made by the cow towards her calves

Breeding Weaning Calving

Previous Calf

New Calf
"We learned years ago that older cows are easy to wean off their calves, but first-time mamas and open cows are determined not to lose their babies. They'll go through several fences to get back to them. Some don't give up even after they've dried up their milk."

(Heather Smith Thomas, BEEF Nov., 1998).
Cows Allowed Fence-line
Contact with Calves
Diagram of Pen
Daily Frequency of Open and Pregnant Cows Observed in Area Nearest Calves

![Bar chart showing frequency of open and pregnant cows per day.](chart.png)
Hormones drive maternal behaviour before, during and after birth.

Oxytocin released in the brain is necessary for the initiation of maternal behaviour and the recognition and memory of the offspring.

Without a proper hormonal profile females will not display appropriate maternal behaviour.
It is important for a mother to recognize her own offspring and be able to discriminate against other offspring. If she is unable to recognize her offspring she runs the risk of providing care (giving her resources) to some other mother’s young. As a result her own offspring may be placed at a disadvantage.
Immediately after birth the cow does not know her own calf. It takes some time for her to learn the cues she will use to recognize her own calf.

Moving newborn calves from the birth site should be done in clear view of the cow.
Distribution of time cattle are receptive to newborns based on hormonal profile.
The normal "cascade" of calving behaviour
The normal “cascade” of calving behaviour
Factors that can block the appropriate maternal behaviour

1) Wrong hormonal profile
2) Lack of cervical stimulation (C-section)
3) Drugs that interfere with oxytocin release (from C-section)
4) Hormones that interfere with oxytocin release (ACTH, stress hormones).
5) Interference by other cows
6) Calving fatigue and weak calf
7) Body condition scores (thinner cows = poorer mothers)
8) Genetics
Cows with C-section 6 times more likely to show signs of rejecting their calf compared to “pulls”.

Overall (heifers and cows combined) 22% of C-sections showed signs of mismothering compared to 8% of births from pulls.
Factors that can aid or start appropriate maternal behaviour

1) Leave females undisturbed during parturition
2) Minimize assistance
3) Taste of birth fluids
   a) Smear onto nose and tongue
   b) Encourage female to lick young
4) Milk letdown
Calves that fail to obtain adequate colostrum before twenty-four hours of age have:


Working with animals is the most common cause of agriculture injury that results in hospitalization in Canada (18.7%).

- cattle related injuries are often related to calving or recently calved cows (Canadian Agriculture Injury Surveillance Program, 2003)

Overly protective cows are often excused as being “good mothers”.
Temperament has been found to be related to maternal behaviour in pigs and monkeys.

Once cows are established in the herd, it can be difficult to remove them.

Predicting what type of mother a heifer will be could be a useful selection tool.
Determine if temperament tests can be used to predict how a cow will react to her calf, people handling her calf, and a potential predator.

Determine if there is a connection between a cow’s reaction to people and a potential predator.
Experiment to see if we can predict or identify the best mothers.

Pre-calving temperament tests
We measured struggle in chute and exit speed
- Post-calving tagging test
  (Cow’s reaction to people and her calf)
- Post-calving predator test
  (Cow’s reaction to potential predator)
Blood test for
  immunoglobulin transfer
Results

Cows that are attentive to their calf were also calmer while they were in the chute and when they exited the chute. This is likely related to their fear of people.
A cow’s temperament before calving was not related to weaning weight of her calf or to the passive transfer of antibodies from the cow to calf.

The level of aggression that a cow showed when her calf was handled was not related to her response in pre-calving temperament tests.
No relationship was found between a cow’s reaction towards people handling her calf and her response to a potential predator.

It is not necessary for a cow to be aggressive towards people for her to show protective behaviour of the calf towards a predator.

Cattle that pose a threat to human handlers are not necessary in cattle herds.
Cow’s do not have to show aggression towards people in order to respond to a potential predator.

These cows are extremely calm and even when their calves are just born or very young we have had no problems doing whatever we want to do to their calves.
When we first had cattle I was attacked several times by protective cows at calving time, and since the first few years, we have culled any cows that have been even slightly protective or aggressive from our herd. We know too many people who have been injured by aggressive of protective cows. *Wayne Ray*
Producer Survey

Determine the incidence of cows who mis-mother (abandon or reject) their offspring at calving.
Determine the incidence of cows displaying severe aggression towards the producer (i.e. would try to hurt the producer if given the opportunity) at calving.
Determine producers’ attitude toward these behaviours.
A voluntary survey was conducted at two Saskatchewan cattle shows in 2009 and at the Annual Saskatchewan Beef and Forage Symposium in 2010.
Survey Demographics

- 168 producers completed the survey
- Herd size ranged from 7 to 1326 cows (median of 149)
- The cumulative number of cows owned by the respondents was 33,621
Incidence of females that are dangerous or mis-mother their calf and the cull rate for these traits

<table>
<thead>
<tr>
<th>Behaviour of mother at calving</th>
<th>Females in herds</th>
<th>Farms with females</th>
<th>1st calf heifers</th>
<th>Mature cows</th>
<th>Females culled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangerous</td>
<td>5.7%</td>
<td>77.4%</td>
<td>4.0%</td>
<td>5.7%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Mis-mothering</td>
<td>1.4%</td>
<td>61.9%</td>
<td>5.0%</td>
<td>0.7%</td>
<td>61.5%</td>
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Factors Producers Believe Cause Cows to Mis-mother their Calf

Number of times selected in top 3 reasons

- General lack of interest by the mother
- Interrupted by cow or person
- 1st calf heifer
- Twins
- C-section/hard pull
- Family line
- Weak calf
- Breed
- Other

0 20 40 60 80 100
Factors Producers Believe Cause Cows to be Dangerous at Calving

Number of times selected in the top 3 reasons

- Family line: 120
- Hormones present at calving: 100
- Breed: 90
- Interrupted by cow or person: 80
- 1st calf heifer: 60
- Other: 40
- C-section/hard pull: 20
- Old cow: 10
- Weak calf: 0
Temperament During Other Times of the Year

Mis-mother
Don't Know 14.3%
Other Differences 1.2%
More Docile 3.6%
More Nervous 7.7%
No Differences 73.2%

Dangerous
Don't Know 6.5%
More Docile 3.0%
More Nervous 24.2%
Other Differences 1.8%
No Differences 61.9%

More Nervous 24.2%
Percentage and extent of producer injuries and cow culling rates as a result of dangerous cows at calving

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<tr>
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<th>Yes</th>
<th>No</th>
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<tr>
<td>Producers injured by cow at calving</td>
<td>36.9%</td>
<td>63.1%</td>
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<td>Of those producers experiencing an injury</td>
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<td>Visited doctor for the injury</td>
<td>11.3%</td>
<td>88.7%</td>
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<td>Culled cow that injured them</td>
<td>53.2%</td>
<td>46.8%</td>
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Conclusions

- Cow’s that are calmer in the chute are more attentive to their calf during tagging.
- Temperament is not related to aggression or offspring performance.
- Cow’s do not have to show aggression towards people in order to respond to a potential predator.
- Few females mis-mother their calves, but they occur on a large percentage of farms.
- Producers attribute genetics as a major cause of dangerous mothers, and in general have a higher tolerance for aggressive females than females that mis-mother their calf.
- Over 1/3 of producers have been injured by aggressive mothers, but just over 50% of the culprits were culled.
- Producers see few consistent differences throughout the year in the temperament of dangerous or mis-mothering females.
Acknowledgements

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- All staff and student assistants
Questions?