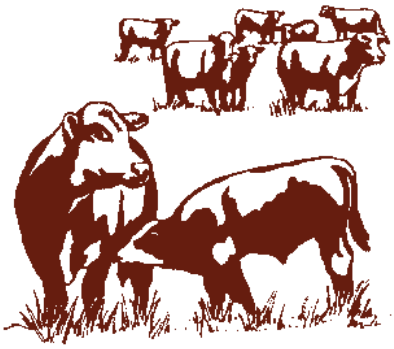

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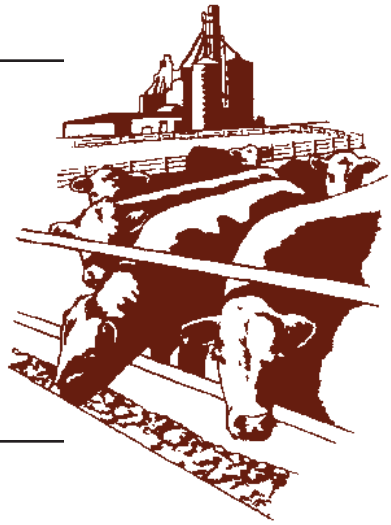

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Calving Difficulty in Beef Cattle: Part II [1]

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Dietary Energy

Many cattle producers believe reducing dietary energy during late pregnancy will decrease fetal size resulting in improved calving ease, whereas increasing energy will increase fetal size leading to a higher incidence of dystocia. Generally speaking, research has shown that lowering the energy allowance will decrease birth weight but will not significantly reduce dystocia. At MARC, Hereford and Angus two-year-old heifers were fed three levels of energy (10.8, 13.7 or 17.0 pound TDN per head per day) for 90 days prior to calving. Increasing the level of dietary energy resulted in increased birth weight but not increased dystocia; in fact, the incidence of calving difficulty was lower in the medium and high energy groups than in the low energy group.

Inadequate nutrition of the young developing heifer can affect her subsequent calving performance. Miles City research showed that restricting the energy of weaned heifer calves during their first winter can have a carry-over effect, resulting in decreased precalving pelvic area and increased dystocia (46 percent versus 36 percent) compared to adequately fed heifers. From weaning to first breeding as yearlings, heifers should be fed to weigh at least 65 percent of their potential mature cow weight. This translates to a range in average daily gain of approximately 1.25 - 1.75 pounds for 200 days. Depending upon initial weight, frame size, body condition and environment, this means that daily TDN requirement will range from 8 - 13 pounds per head.

When they calve as two-year-olds, heifers should weigh 85 percent of their mature cow weight. This translates to an average daily gain of about one pound per day from breeding to calving. Adequate pasture conditions will support this level of performance. During the winter prior to calving, pregnant heifers require from 9 - 13 pounds of TDN per day. The mature pregnant cow requires from 7.5 - 13 pounds of TDN.

Dietary Protein

There is some concern in the cow-calf industry that high levels of protein during the last trimester of pregnancy may lead to a significant increase in birth weight and dystocia. At Miles City, crossbred, two-year-old pregnant heifers were fed diets containing either 86 percent (low) or 145 percent (high) of the National Research Council (NRC) crude protein requirement for 82 days prior to calving. Heifers fed the low protein diet had significantly lighter calves at birth and less calving difficulty. Heifers on the high protein diet gained more weight, had higher condition scores at calving, maintained more body weight throughout the study, and weaned significantly heavier calves. In a repeat study at Miles City, there were no differences in calf birth weight or calving difficulty. Research at other institutions has shown no consistent effect of protein level on dystocia. It would appear that precalving dietary protein levels should be near the NRC requirement. If it is extremely low, weight and condition of the cows and weight, vigor and post-natal growth rate of the calves may be reduced. If it is unduly high, it represents an economic waste. During the last trimester of pregnancy, crude protein requirements range form

1 (Authors' note: This fact sheet is second in a series of two on calving difficulty).

8.2 - 9.8 percent for heifers and 7.6 - 8.2 percent for mature cows.

Body Condition

Prior to the last trimester of gestation, females should be evaluated for body condition. Those in thin condition (body condition score 4 or less on a 1 - 9 scale) should be fed separately from those in moderate or higher condition so their dietary energy level may be increased. By calving time, the goal would be to have mature cows in moderate condition (score of 5) and first-calf heifers in high moderate condition (score of 6). Over-feeding females to the point of obesity has been shown to increase the incidence of dystocia. Texas researchers reported that as fatness score increased above a moderate level in first-calf Santa Gertrudis heifers, calving difficulty increased. They concluded that efforts should be made prior to calving to prevent over-conditioning of females in an effort to reduce dystocia.

Implants and Feed Additives

Numerous studies have shown that implanting heifer calves with zeranol (Ralgro™) increases pelvic area at breeding time. However, in most instances, this increase did not persist up to calving time and there was little effect on calving difficulty. Similar results have been reported when Synovex-C™ implants were used on suckling heifer calves. Some producers believe that feeding an ionophore such as monensin (Rumensin™) or lasalocid (Bovatec™) increases calving problems. However, research has shown these compounds have no effect on gestation length, calf birth weight, pelvic area, or dystocia.

Feeding Time

The time of day the cow herd is fed during calving season has been shown to influence when calves are born. The data indicate that cows fed at night are more apt to calve during daylight hours when they can be observed closely. Gus Konefal, a Hereford breeder in Manitoba, was the first to recommend this feeding strategy. Consequently, it has been called the "Konefal Method" of daytime calving. This system involves feeding twice daily, once at 11:00 a.m. - 12 noon and again at 9:30 p.m. - 10:00 p.m. This regime starts about one month before the first calf is born and continues throughout the calving season By following this feeding program, Konefal reported that 80 percent of his cows calved between 7:00 a.m. and 7:00 p.m. Similar results were obtained in a study at Iowa State University. These two studies prompted Miles City researchers to conduct a three-year study on feeding time. Their results were not as dramatic as those of the earlier studies. Nevertheless, the percentage of cows calving between 10:00 p.m. and 6:00 a.m. was consistently 10 - 20 percent lower for the late-fed than for the early-fed cows. Similar research conducted at the Brandon Research Station showed a 13.5 percent reduction in cows calving between midnight and 7:00 a.m.

Exercise

Forced exercise for several weeks prior to calving has been shown to improve the calving ease of closely confined dairy heifers. However, Miles City researchers could find no difference in calving ease between heifers maintained in a typical feedlot and those forced to walk two miles a day. It was concluded that unless beef heifers are under extremely close confinement, exercise is of no benefit in reducing dystocia.

Calving Time Management

In addition to knowing **how** to give assistance, it is also important to know **when** to help. For years, the general recommendation was to intervene if the cow was in intense labor for 2 - 3 hours without making progress. Research at Miles City suggests that it may be beneficial to give assistance earlier. They reported that intervening as soon as the cervix was fully dilated and the membranes and the calf's feet extended from the vulva (beginning of second stage of labor), resulted in significant advantages over a group of females that received no assistance unless it was needed to save the calf. These advantages were; higher percent in heat at beginning of breeding season (91 percent versus 81 percent); higher first service conception rate (75 percent versus 60 percent); and higher pregnancy rate in October (90 percent versus 76 percent). These advantages were observed in mature cows as well as in first-calf heifers. It was reported that duration of the second stage of labor averaged 54 minutes for heifers and 23 minutes for cows. Out of this research, the following time limit was set at the Miles City station: if definite progress has not been made after one hour of intense labor, the calf is pulled. They caution, however, that the cervix should be fully dilated and the calf's feet visible. Also, the position of the fetus must be normal; for example, if either of the legs or head are back they must be corrected before assistance is given.

Genetic Management

From a genetic standpoint, there are several traits which may be considered in a selection program to keep dystocia under control; they are: (1) Individual birth weight; (2) EPD (expected progeny difference) for birth weight; (3) The sire's EPD for direct (his own) calving ease on first-calf heifers; (4) The sire's EPD for maternal (his daughters) calving ease on first calves (5) The sire's pelvic area; (6) The pelvic area of potential replacement heifers.

Birth Weight and EPDs for Birth Weight

Although individual birth weights can be used as a guide in selecting young unproven bulls, EPDs are better predictors because they combine data from several sources—the individual, his ancestors and his half-sibs. As a bull becomes older and sires a significant number of progeny, the accuracy of his EPDs improve markedly. By then, his individual birth weight is of little or no significance. A number of studies have shown strong correlations between EPDs of sires and actual birth weights of

their progeny, especially among sires with high accuracy (over .80).

In order to minimize dystocia in first-calf heifers, ideally, they should be mated to bulls with breed average or lower birth weight EPDs. For maximum precision, a young unproven bull's EPD should be compared against the breed average for bulls in his own birth year group. Breed average information is contained in many of the sire summaries published by National breed associations.

As noted before and shown in *Table 4* (CSU data), birth weight is a moderately heritable trait and is positively genetically correlated with other growth traits. Therefore, many bulls having average to below average birth weight EPDs will be average or lower for other growth traits. However, there are exceptions, and a search of sire summary lists can be used to identify bulls that have low birth EPDs and average or higher weaning and yearling EPDs.

A calf's birth weight is influenced by both the sire's and the dam's genotype for birth weight. Therefore, selecting heifers from sires with low birth weight EPDs can stack the herd's pedigrees in favor of calving ease.

Table 1. Heritabilities of Growth Traits and Their Genetic Correlations with Birth Weight.

Trait	Heritability	Genetic correlation with birth weight
Birth weight	.41	—-
Weaning weight	.32	.36
Yearling weight	.43	.29
18-month weight	.61	.69

EPDs for Calving Ease

Direct Calving Ease. Except for Simmentals, this EPD is reported as a ratio; sires with higher ratios will calve easier when mated to first-calf heifers. The Simmental Association provides direct calving ease EPDs for **both** heifers and cows. Simmental EPDs are expressed in percent unassisted births, with positive numbers indicating greater calving ease. In general, EPDs for direct calving ease are closely related to EPDs for birth weight. All breed associations publish EPDs for birth weight, but only three associations report calving ease EPDs.

Maternal Calving Ease. This trait is reported and interpreted in a manner similar to direct calving ease. This EPD predicts how easily a sire's **daughters** will calve. Heritability estimates of calving ease have been lower than those reported for birth weight. This suggests that genetic progress made by selecting directly on calving ease EPDs would be slower. An exception would be the Simmental breed in which calving ease EPDs have been shown to be a more accurate indicator of dystocia than birth weight EPDs. This is because Simmental calving ease EPDs incorporate birth weight as well as a score for calving ease. For long-term improvement in the herd, using sires with high maternal calving ease EPDs and retaining their daughters should be beneficial.

Pelvic Area

Please refer to the first fact sheet (Part 1) in this series for a complete discussion of selecting for pelvic area.

Selecting Natural Service Bulls

The producer who is not in a position to artificially inseminate first-calf heifers does not normally have the option of using highly proven sires with high accuracy EPDs for birth weight and/or calving ease. An alternative is to purchase an older bull, known for his calving ease, from another producer in the area. Transmission of disease is a potential risk when this is done. A more realistic option is to purchase an unproven bull that has a low birth weight EPD, a large pelvic area and a low individual birth weight (adjusted fox age of dam). If birth weight EPDs are not available, try to look for sons of highly proven calving ease sires. Even better, look for young bulls whose sire and maternal grandsire are both highly proven calving ease sires. If no information is available except for an individual birth weight, consider the age of the dam when the bull was born because younger cows give birth to lighter calves. Ideally, birth weights should be adjusted to a 5 - 10-year-old dam equivalent by adding the following adjustments: two-year-olds, 8 pounds; three-year-olds, 5 pounds; four-year-olds, 2 pounds; eleven1-year-olds and over, 3 pounds. These are standard adjustments published by the Beef Improve-ment Federation; some breeds have their own adjustments. However, relying solely on individual birth weight is risky business. A low birth weight bull whose sire may have unknowingly been a high birth weight sire is not likely to be a good candidate for use on virgin heifers.

Summary

In summary, research has shown the following strategies to aid in alleviating calving problems:

1. Develop heifers properly so they achieve at least 65 percent of their mature weight by breeding time and 85 percent by the time they calve as two-year-olds.
2. Breed virgin heifers one heat period before the mature cow herd and give them extra attention at calving time.
3. Know the pregnant female's nutrient requirements. Neither underfeed nor overfeed her. Body condition scores at calving time should fall within a range of 5 - 6 on a 9-point scale.
4. Using the Konefal Method may cause more emales to calve in the daytime when they can be observed closely.
5. Know when and how to give assistance and when to consult a veterinarian.
6. Measure pelvic areas of potential replacement heifers and cull the lower end.

7. Mate virgin heifers to low-risk bulls:
   a. Proven A.I. sires with high accuracy EPDs for birth weight and/or calving ease.
   b. Unproven bulls with low birth weight EPDs, large pelvic areas and low individual birth weights.
8. Retain daughters of sires that combine low birth weight EPDs and high maternal calving ease EPDs.

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