Dystocia in Beef Females

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The number of calves produced each year within a cow-calf operation depends on two main factors: (1) success of cows and/or heifers to conceive and maintain the pregnancy and (2) birth of viable and healthy calves. Within the many factors affecting calf survival, the most important is dystocia, which is the technical term for a difficult birth that needs assistance. Depending on the degree and type of dystocia, it can result in a weakened/dead calf and injury/death to the dam.

Supporting this statement, calf death during or shortly after calving results in losses of over 3.5 million calves every year in the United States, wherein 45 percent of these losses are caused by dystocia. Along with decreased calf crop, dystocia is also associated with increased cow mortality, veterinary and labor costs, and impaired subsequent reproductive performance. For more info about handling dystocia, please refer to 447, Handling Calving Difficulties.

Causes of Dystocia

Although many management and genetic factors affect the incidence of dystocia in the cowherd, the most common cause of dystocia is maternal/fetal disproportion. This occurs when the calf is too large for the size of the birth canal of the cow. Therefore, size of calf as well as age and size of the dam at calving determine the incidence of dystocia. In more detail, most common factors associated with dystocia include:

- Calf birth weight
- Pelvic area
- Gestation length
- Sex of calf
- Age and parity of dam
- Size and breed of dam
- Sire breed

Calf Birth Weight

It has been shown that the incidence of dystocia increases as birth weight increases (Fig. 1). Therefore,

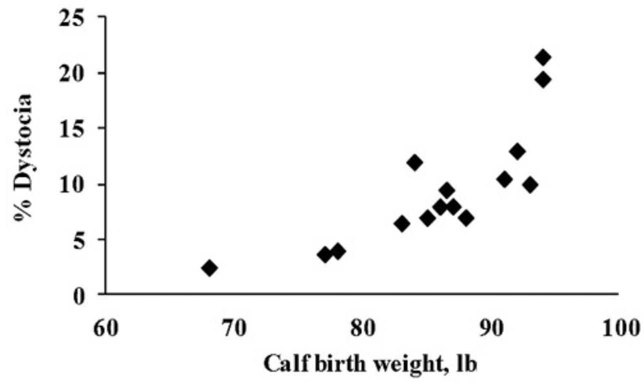

Fig. 1. Relationship of dystocia and average calf birth on Hereford and Angus females calving at 4 years of age and older.

special attention should be given to the factors that influence birth weight to prevent dystocia. Breed of the sire and dam, along with genetic traits of both parents, are major influences on calf birth weight. Thus, selecting replacement heifers for low birth weight, choosing sires according to their expected progeny differences (EPDs) for birth weight and calving ease, as well as sire actual birth weight and body shape, will likely alleviate calving problems within a herd.

Pelvic Area

The pelvic area determines the maximum birth size that can be accommodated by an individual cow before calving difficulty is experienced. Heritability estimates for pelvic dimensions are moderate, ranging from 0.40 to 0.53 (see 446, Pelvic Area in Beef Cattle Production). Reports are conflicting relating pelvic area to dystocia, which puts the usefulness of pelvic measurements in question.

In general, culling the 10 percent of the heifers with the smallest pelvic size will only result in a reduction in dystocia of 2 to 3 percent in the herd. This could be explained by the fact that pelvic dimension appears to be highly correlated with dam size. By selecting for large pelvic dimensions, producers are also indirectly selecting for large heifers, which typically have greater nutritional requirements and also produce large calves.

Consequently, the use of pelvic measurement has not been shown to be a reliable and efficient selection criterion to reduce incidence of dystocia in beef herds. Nevertheless, establishing a culling threshold for pelvic area according to the characteristics of the herd, particularly when evaluating heifers that were purchased from a different ranch or heifers within a ranch with historical dystocia challenges, is still warranted to minimize dystocia rates in beef operations.

Gestation Length

Gestation length can have an indirect influence on calving difficulty. As gestation length increases, birth weight increases from 0.3 to 0.8 pound per day. Gestation length is a trait that is heritable; therefore, cattle can be selected for shorter gestation length and subsequently lighter birth weights. However, selecting cattle for birth weight independent of gestation length has the same effect and is a more effective approach to reduce incidence of dystocia compared to selection for shorter gestation.

Sex of Calf

Typically, bull calves outweigh heifer calves at parturition by up to 10 pounds. Bull calves generally have longer gestation length compared to females, which contributes to increased birth weight. Because of heavier birth weights, many reports indicate that bull calves require higher assistance rate compared to heifer calves during birth. Additionally, it has been shown that dystocia rates in mature cows carrying male calves are twice that of cows carrying female calves.

Age and Parity of Dam

The incidence of dystocia decreases as dam parity increases. Table 1 summarizes calving data from the University of Nebraska and Colorado State University relating calving difficulty to age of dam at calving. Mature cows have greater body size and pelvic area compared to heifers; therefore, adult cows are capable of giving birth to heavier calves.

When bred to the same bull, first- and second-calf dams experience more calving difficulty, despite delivering lighter birth weight calves (by 2.5 to 5.0 pounds) than mature cows. Partitioning of nutrients toward growth of the dam may reduce calf birth weight in young cows. However, the reduced weight of the calf does not fully compensate for reduced skeletal dimensions of the young dam.

Table 1. Effect of dam's age on calving difficulty.

	% of difficult calvings	
Dam's age	**Ranch 1**	**Ranch 2**
2 years	54	30
3 years	16	11
4 years	7	7
5 or more years	5	3

Size and Breed of Dam

Body size is highly correlated with pelvic area, and pelvic dimensions determine limitations to the size of the calf that can go through the birth canal. Typically, larger breeds of cattle have larger pelvic areas and produce calves with heavier birth weights than smaller breeds. Therefore, dystocia rates do not differ significantly between dams of various beef breeds that also vary in size.

Data from the University of Nebraska show little difference in incidence of dystocia when 15 breeds were compared. Exceptions include Jersey-crosses and two Zebu-crosses breeds, which experienced an average of 3.7 percent incidence of dystocia compared to an average of 14.1 percent for the other breeds in the study.

Sire Breed

Most producers are well aware of the impact that the bull has on the incidence of calving difficulty and subsequent calf death loss. Traditionally, commercial beef cattle producers have predominantly used British breed sires on first-calf heifers due to their small calf size at birth. Unfortunately, as beef and seedstock producers emphasized sire selection according to adult body size and growth rate, many British breed bulls are now producing large birth weight calves.

With proper bull selection and heifer development, however, producers can still breed cows with British breeds and even some Continental breeds. Emphasis on multiple trait sires (bulls with acceptable EPDs for birth weight, calving ease, and growth) can minimize the degree of calving difficulty, while still maintaining performance traits. Furthermore, selecting replacement heifers out of bulls with low EPDs for birth weight should help reduce birth weight and calving difficulty.

Selecting heifers out of low birth weight sires tends to result in females with a lower mature size, which may, or may not, be desirable. Therefore, producers should evaluate important sire EPDs (birth weight, calving ease, and daughter's first-calf calving ease) when selecting replacement heifers.

Other Contributing Factors in Dystocia

Nutritional Program

Supplemental energy fed for 90 to 100 days before calving has been shown to increase birth weight but does not have an adverse effect on calving ease. Furthermore, the incidence of calving difficulty is actually reduced when cows consume moderate and high amounts of energy compared to low energy intake (Table 2). Inadequate protein intake during gestation

Table 2. Effect of pre-calving energy level on birth weight and dystocia in 2-year-old heifers.

Energy intake	Birth weight, lb	% of dystocia
Low intake (10.8 lb of TDN)	58.0	26
Medium intake (13.7 lb of TDN)	61.5	17
High intake (17.0 lb of TDN)	63.9	18

also results in decreased calf vigor, delayed uterine involution, increased interval to estrus, and decreased conception rates after calving.

These problems appear to be increased when energy is also deficient, illustrating the need for a properly balanced diet of cows during pregnancy. These data clearly demonstrate that "you cannot starve calving difficulty out of cows and heifers."

Body condition of the dam has also been implicated as a factor that contributes to calving difficulty and is closely related to nutritional status during gestation. Underfeeding cows to the point where they are emaciated will result in calving difficulty probably due to lack of strength during the delivery process, and these cows typically have weak, non-vigorous calves.

Overfeeding cows to the point of obesity, however, will also result in dystocia, probably due to a fat-filled birth canal and increased abnormal presentations. Therefore, it becomes extremely important that cows are not over-fed or under-fed during pregnancy but are provided adequate feed to meet their nutritional requirements and those of the fetus.

Hormonal Implants

Implanting heifer calves with Ralgro® or Synovex-C® increases pelvic area in young heifers but has little effect on calving difficulty. By calving time, the pelvic size is similar to non-implanted heifers. Further, these implants do not improve age or weight at puberty and can decrease fertility.

Feed Additives

Ionophores such as Rumensin® or Bovatec® decrease age at puberty but have no effect on gestation length, calf birth weight, pelvic area, or dystocia. Therefore, ionophores have positive effects on heifer development and can be used as long as the diet is adequate for growth and development of the heifer and the fetus.

Geographical Location

Calf birth weight is greater in colder environments compared with warmer, southern climates. As a result, northern states tend to experience a higher rate of calving difficulty than their southern neighbors. A research study evaluated genetically similar Hereford cattle calved part in Montana and part in Florida. Each group was then moved to the other location and 10 years later, birth weight data were compared. Results of this study are shown in Table 3 and clearly support the effect of colder environments on increased birth weights.

Table 3. Genetic x environmental interaction: Effects on birth weight in Hereford cattle.

Herd origin	Herd location at calving	No of calves	Birth weight, lb
Montana	Montana	727	81
	Florida	677	64
Florida	Montana	405	77
	Florida	363	66

Season of the Year

Fall-born calves usually are lighter and born with less assistance than spring-born calves. This can be partially explained by nutrition and environmental conditions. Hot summer temperatures tend to reduce birth weights, whereas cold temperatures increase birth weights.

Fetal Position

About 5 percent of the calves at birth are in abnormal positions, such as forelegs or head turned back, breech, rear end position, sideways or rotated, etc. (Fig. 2). This requires the assistance of a veterinarian or an experienced herdsman to reposition the fetus correctly before delivery. If fetal position cannot be corrected,

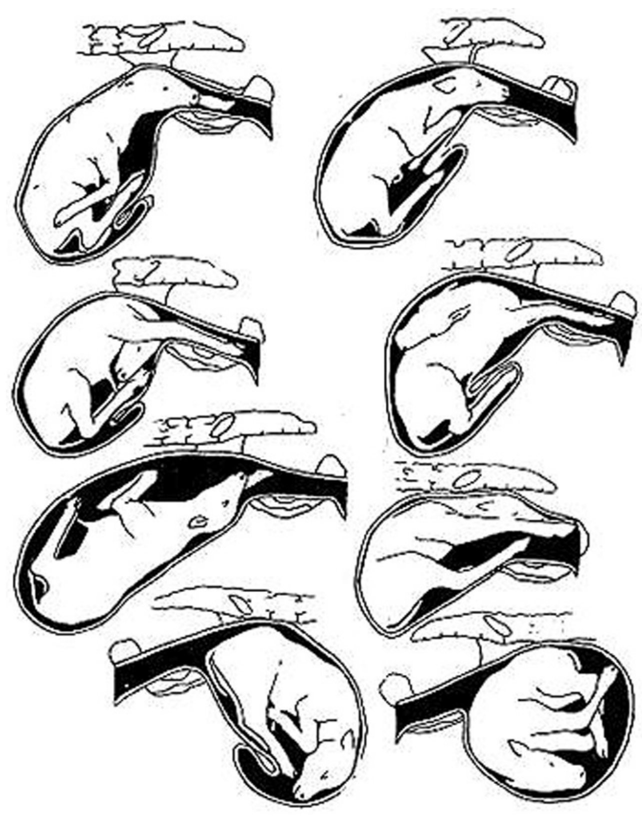

Fig. 2. Some of the abnormal birth positions that may be seen in cows.

the veterinarian may have to perform a caesarean section or fetotomy. For more information about handling calving difficulties due to malpositioned calves, please refer to 447.

Summary

Dystocia is the technical term for a difficult birth that may or may not require assistance. Depending on the degree and type of dystocia, it can result in a weakened/dead calf and injury/death to the dam. The main cause of dystocia in cattle is maternal/fetal disproportion. Therefore, management that prevents this occurrence, including proper sire selection and adequate nutritional management of the dam, alleviates the incidence of dystocia in beef operations.

When dystocia is caused by abnormal fetal position, assistance is often required to reposition the fetus to allow delivery, and knowledge on how and when to provide assistance is essential to ensure dam and calf welfare (see 447, Handling Calving Difficulties).

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