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EFFECT OF PELVIC AREA ON CALVING DIFFICULTY AND CALF SURVIVAL IN SANTA GERTRUDIS AND SANTA GERTRUDIS CROSS-BRED HEIFERS

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Background. Reproductive management of first-calf beef heifers represents a major challenge for the cow-calf producer. Cross-breeding systems which utilize large terminal sire breeds have become a virtual economic necessity. At the same time, these systems have promoted an increased incidence of calving difficulty and calf mortality, particularly for first-calf heifers. Dystocia in beef females appears to result from the disproportionate pelvic canal area of the dam relative to the calf's body size at birth. Calf losses related to dystocia are a major factor contributing to the annual reduction in the weaned calf crop. Both long-term and short-term management goals should be considered to minimize these losses.

In the long term, breeder selection practices can be used to reduce dystocia within a herd. Because pelvic area and body weight are genetically related, selection for increased dam body weight, in an effort to reduce calving difficulty, has appeared to be a practical option. This will result in dams with larger pelvic areas, however, larger dams also produce proportionately heavier calves at birth. An alternate criterion, pelvic area, is a moderately heritable growth trait, therefore some form of selection utilizing this physical measure would be more efficient in reducing incidence of calving difficulty over several generations without large increases in average cow weight and the associated maintenance costs.

In the short term, some physical measure obtained during the production cycle can be used to identify individuals with a higher likelihood of dystocia. Culling at joining or during the breeding season are relatively impractical due to the continuing growth and development of the heifer. However, pregnancy testing generally provides a practical opportunity to both evaluate each individual and take actions based upon that evaluation. One option in this regard involves the use of pelvic canal measurements.

In an ongoing cooperative effort with the King Ranch, Kingsville, TX, we examined the relationships of pelvic canal area to calving difficulty and calf survival in three breed types of first-calf heifers. Included were 1915 Santa Gertrudis, 656 Red Angus X Santa Gertrudis F-1, and 423 Gelbvieh X Santa Gertrudis F-1 heifers. A commercially available Rice Pelvimeter was used to obtain pelvic heights and widths during fall pregnancy testing. Pelvic areas were then calculated for each heifer by multiplying these dimensions. In addition, body weights and hip heights were recorded. During the spring calving season, independent incidence of calving

difficulty and(or) calf death loss were recorded.

Research Findings. Across breed types, pelvic areas ranged from 180 to 360 cm^2, however, approximately 80% of the assisted heifers had pelvic areas between 180 and 210 cm^2. With respect to all 2994 pregnant individuals, 16.6% of heifers with pelvic areas smaller than 210 cm^2 required assistance at parturition compared to only 1.1% of those heifers with pelvic areas larger than 210 cm^2. Similarly, the percentage of calf death losses was higher for heifers with pelvic areas between 180 and 190 cm^2 (12.8%) than for heifers with pelvic areas of 190.1 to 260 cm^2 (7.6%). Heifers with pelvic areas greater than 260 cm^2 lost the smallest proportion (2.5%) of their calves at birth.

As might be expected, pelvic areas associated with the straight-bred Santa Gertrudis heifers were smaller relative to those of the F-1 females of either breed type, however, pelvic areas were approximately the same for Red Angus F-1 and Gelbvieh F-1 heifers. The percentage of heifers having pelvic areas smaller than 210 cm^2 was highest for the Santa Gertrudis heifers (30.9%), compared to 20.1% for the Gelbvieh F-1 heifers and 13.4% for the Red Angus F-1 heifers. Similarly, the percentage of assisted births was greater for the Santa Gertrudis heifers (6.6%) than for either the Gelbvieh F-1 (3.8%) or Red Angus F-1 heifers (1.8%). Calf death losses did not differ among the three breed types.

The relationships of pelvic area to body weight or hip height measurements were both positive and generally linear. Additional data regarding these relationships suggest that while body weight or hip height measurements may provide an indication of an individual's predisposition to have difficulty at parturition, neither measurement would be as accurate a predictor as pelvic dimensions. In summary, first-calf heifers with pelvic canal areas smaller than 210 cm^2 experienced a higher incidence of calving difficulty and pelvic areas smaller than 190 cm^2 were associated with greater calf mortality rates at parturition. Due to breed related differences, cross-bred F-1 heifers experienced a lower incidence of both calving difficulty and calf mortality relative to the straight-bred females.

Application. The reported distinctions in calving performance relative to pelvic area are probably quite specific to this particular production system. This conclusion stresses the importance of both sire selection and the maintenance of sound herd-performance records for each production unit. Identifying the individuals at high risk for calving difficulty and taking some action prior to the calving season, such as induced abortion or relocation to an easily monitored pasture, will reduce potential death losses and(or) labor requirements during calving. Regardless of the method, pregnancy testing provides a practical opportunity for this evaluation to take place.