

The Effect of Dietary Protein Concentration During Gestation and Pelvic Diameter on Dystocia and Birthweight in *Bos Indicus* Cross Heifers

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Feto-pelvic disproportion is reported to account for the majority of calving associated losses in extensively managed *Bos taurus* heifers calving at 2-years of age (Johnson *et al.* 1988; Basarab *et al.* 1993). There is a paucity of knowledge, however, on the role of dystocia and feto-pelvic disproportion in *Bos indicus* cross heifers calving at 3-years of age. As such the aim of this experiment was to determine if a) dietary protein concentration in the first two trimesters of pregnancy affected the incidence of dystocia in 3-year old *Bos indicus* cross heifers and, b) pelvic area measurement prior to joining could be used as a selection tool to reduce the incidence of dystocia in these same animals.

Pelvic area of *Bos indicus* cross heifers (n=120) was calculated from measures of pelvic diameter taken across a horizontal and vertical plane using a Rice pelvimeter 2 months prior to insemination. The horizontal measure was taken as the widest distance between the wings of the ilium and the vertical measure was taken as the shortest distance between the pubis and sacrum. These two measures were then multiplied together giving a hypothetical measure of pelvic area (Johnson *et al.* 1988). Heifers were then inseminated with semen from the same bull on a single day and allotted to 4 treatment groups based on liveweight at the time of pelvic area measurement. They were fed high (H=13.5%) or low (L=4.8%) crude protein diets during the first and second trimesters. During the third trimester all heifers received a ration of 11.2% crude protein.

A total of 71 heifers calved (LL n=19, LH n=17, HL n=18, HH n= 17). Calves were weighed within 15 minutes of birth prior to suckling and each delivery categorised as eutocic (n=61) or dystocic (n=10) with dystocic calvings including those due to both malpresentation and fetopelvic disproportion.

The mean birthweight (\pm SE) of each treatment group was LL= 29.9 \pm 0.9kg; LH = 33.4 \pm 1.0kg; HL = 31.3 \pm 0.9kg and HH = 32.9 \pm 1.0kg. There was no effect of first trimester dietary protein concentration on calf birth weight however high dietary protein concentration in the second trimester resulted in an 8.3% increase in calf birthweight (P=0.01). In association with this, a 1kg increase in calf birthweight increased the risk of dystocia occurring by 1.44 fold (P=0.003). Pelvic area 2 months prior to joining tended to be inversely associated with the incidence of dystocia (P=0.08) such that a 1cm² increase in pelvic area tended to reduce the risk of dystocia by 0.96 (P=0.07)

The effect of nutrition during critical periods of gestation on birth weight and the relationship between birth weight and dystocia is evident. This study suggests that maternal dietary protein concentration during the second trimester of gestation may be a critical factor in the resultant incidence of dystocia in 3-year old *Bos indicus* cross heifers. Additionally the study supports the use of pelvic area measurement prior to joining as a useful management tool to aid in decreasing the incidence of dystocia. The findings from this study may address some of the welfare and economic considerations associated with heifer dystocia in extensively managed beef heifers.

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