Clinical Use of Reproductive Tract Scoring to Predict Pregnancy Outcome

A. S. Leaflet R1656

Mel Pence, adjunct instructor, veterinary medicine
Russell BreDahl, extension field specialist
John U. Thomson, professor, veterinary medicine

Summary

Heifers in the MACEP heifer development program were reproductive tract scored from 1993 through 1997. These heifers were born between February 1 and May 15 each year. They were brought to the MACEP heifer development program in the fall or winter and fed to attain 65% of their mature body weight at breeding time. The heifers were reproductive tract scored 30 to 60 days prior to breeding; estrus cycles were synchronized, and heifers were bred by artificial insemination (AI) 12 hours after they were observed in standing heat. Ultrasound evaluation was utilized at approximately 30 days post AI breeding to determine the AI pregnancy rate. There was a positive correlation between high reproductive tract scores and percentage conception by AI.

Introduction

The relative economic importance of reproductive traits to the beef industry is estimated at twice the importance of beef production traits and four times the importance of product traits. The selection and management of replacement heifers influences the reproductive efficiency of the cattle industry. Heifers that mature early are capable of being bred earlier in a controlled breeding season and should wean a heavier calf. These heifers tend to breed early each breeding season for the rest of their reproductive lives and have lifetime heavier weaned-calf weights. With this economic value placed on reproduction, ways to measure and predict reproductive efficiency in cattle are needed. One method to estimate reproductive efficiency was developed by researchers at Colorado State University. A reproductive tract scoring (RTS) system was developed as an indirect determination of age at puberty. Yearling heifers were palpated at approximately 30 days prior to breeding to determine uterine horn size, ovarian size and ovarian structures. Heifers were assigned a reproductive tract score of 1 through 5. A RTS of 1 was an immature, non-cycling reproductive tract, and a RTS of 5 was a cycling heifer with a functional corpus luteum (Table 1). This system was used to generate the data for this study from cattle in the Midcrest Area Cattle Evaluation Program (MACEP) at Tingley, IA, from 1993 through 1997.

Materials and Methods

An average of 12 different cattle producers entered heifers in the MACEP Heifer Development Program each year to be managed and bred. The heifers were returned to their owners after the final determination of pregnancy. Heifers were born between February 1 and May 15 in 1992,1993, 1994, 1995 and 1996. Pre-entry requirements include vaccination for Brucellosis, 7-way Clostridia, IBR, PI3, BVD and BRSV. Heifers were commingled in the fall or early winter, fed a ration to attain 65% of their mature weight at breeding, boostered with IBR, PI3, BVD, BRSV, 5 Way-Leptospirosa and Campylobacter, and treated for internal and external parasites. Heifers' reproductive tracts were scored (using the RTS system developed at Colorado State University) at approximately 35 days prior to breeding. Heifers were synchronized using .5mg of MGA ® per heifer per day in their ration for 14 days, and a single injection of PGF 2 alpha ® (Upjohn Co., Kalamazoo, MI) was given 17 days after the last feeding of MGA®. The heifers were artificially inseminated at approximately twelve hours after first noted in standing heat. Heifers not detected in standing heat were inseminated at 72 or 96 hours. All heifers were artificially inseminated one time and then moved to a breeding pasture with a group of bulls. Ultrasound was used to determine early pregnancy by artificial insemination at approximately 30 days post AI. A final pregnancy diagnosis using a combination of rectal palpation and/or ultrasound was made at approximately 45 days after the bulls were removed from the breeding herd.

Results and Discussion

The data in this study are from 1,017 heifers over a five-year period. The RTS were evaluated as a predictive measure of pregnancy. Heifers with a RTS of one were culled prior to breeding. The data showed a significant positive relationship between RTS and percentage of heifers pregnant by AI ($P > .01$) and between heifers pregnant at the final pregnancy check ($P > .01$). Average percentage pregnant by artificial insemination (AI) was increased as the RTS increased (Figure 1). The data also showed that the average final pregnancy rate, including AI and bull bred, was increased as the RTS increased (Figure 2).

Implications

Reproductive tract scoring has been shown to be an effective predictor of reproductive efficiency in beef heifers. Reproductive tract score is moderately heritable (.32). This procedure could be

used in any commercial heifer-breeding program to select for reproductive efficiency.

Table 1. Description of Reproductive Tract Score*

Reproductive Tract Score	Uterine Horns	Ovaries Approximate Length (mm)	Height (mm)	Width(mm)	Ovarian Structures
1	Immature <20 mm diameter	15	10	8	No Palpable follicles, no tone
2	20-25 mm diameter	18	12	10	8 mm follicles, no tone
3	25-30 mm diameter	22	15	10	8-10 mm follicles, slight tone
4	30 mm diameter	30	16	12	>10 mm follicles, good tone, Corpus luteum poss
5	>30 mm diameter	>32	20	15	>10 mm follicles, good tone, erect Corpus luteum present

** From: Anderson K. MS Thesis. Colorado State University. 1987*

Figure 1. AI pregnancy percentages by reproductive tract score.

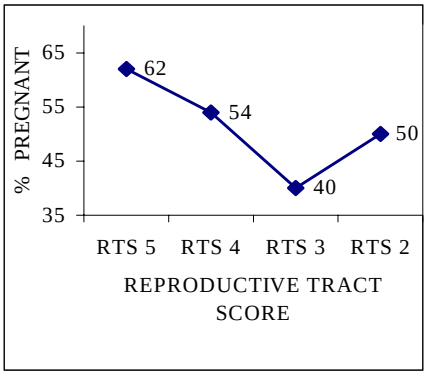

Figure 2. Final pregnancy percentage reproductive tract score.