Clinical Use of Reproductive Tract Scoring To Predict Pregnancy Outcome

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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.[1] The selection and management of replacement heifers influence the reproductive efficiency of the cattle industry.[2] Heifers that mature early are capable of being bred earlier in a controlled breeding season and will wean a heavier calf.[3] These heifers tend to breed early each breeding season for the rest of their reproductive life and have a lifetime heavier weaned calf weight.[4] 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.[5] 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 determined 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, noncycling 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 1992 through 1997.

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 Feb 1 and

Table 1[a]. Description of reproductive tract score.

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

[a] From: Anderson K. MS Thesis. Colorado State University. 1987

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 70% 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 0.5mg 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 inseminated one time and then moved to a breeding pasture with a group of bulls. The bull to heifer ratio was one bull per each 25 heifers. All bulls were required to pass a Breeding Soundness Evaluation. The bulls were removed after approximately a 70 day breeding period. Ultrasound was used to determine early pregnancy by artificial insemination at approximately 40 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.

The data in this study are from 1017 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 that in each of the years studied artificial insemination (AI) pregnancy rate was increased as the RTS increased (Table 2).

References

Newman, Scott and Melton, Bryon. 1995. Multi- Trait Selection for the U.S. Beef Industry: A Question of Balance. BIF Fifth Genetic Prediction Workshop. Patterson, David. *et al.* 1992. Management Considerations in Heifer Development and Puberty. *J. Anim. Sci.* 1992. 70: 4018-4035 Lesmeister, J. *et al.* 1973. Date of First Calving in Beef Cows and Subsequent Calf Production. *J. Anim. Sci.* 36:1 Witbank J. 1995. Challenges For Improving Calf Crop. Factor Affecting Calf Crop Edited by Feilds and Sand CRP Press 1995. Anderson K. *et al.* 1991. The Use of Reproductive Tract Scoring in Beef Heifers. Agri-Practice Vol 12, No 4 July/August 1991.

Table 2. Heifers pregnant by year-reproductive tract score.

	5oai[1]	5pai	5of	5pf	4oai	4pai	4of	4 pf	3oai	3pai	3of	3pf	2oai	2pai	2of	2pf*
1992	43	45	6	81	47	39	12	74	20	10	3	26	1	1	1	1
1993	42	119	9	150	16	39	2	53	2	1	0	3	0	0	0	0
1994	69	104	10	164	26	45	5	66	9	6	1	14	0	0	0	0
1995	33	44	9	68	47	59	17	88	20	24	7	37	2	0	1	1
1996	21	24	3	42	29	14	5	38	11	1	3	8	1	3	0	4

	RTS5	RTS4	RTS3	RTS2
Average % preg AI	62	54	40	50
Average% preg Final	93	87	86	75

[1](oai) not pregnant by AI (pai) pregnant by AI (of) open at final preg test (pf) pregnant at final preg test
*The number of heifers with a RTS of two was not sufficient to be statistically significant.