Effects of Weaning Productivity, as Mediated Through Sire Selection, on Subsequent Pregnancy Rate of the Cow Herd[1,2]

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Abstract

The present study, conducted to determine the impact of level of weaning productivity on subsequent pregnancy rate of the cow herd, involved two locations in the Southern Region - University of Kentucky, Lexington and Hill Farm Research Station, Louisiana State University Agricultural Center, Homer. Differences in level of (**WW**) productivity were created by producing calves sired by high and average bulls selected on the basis of direct WW expected progeny differences (**EPD**) (Kentucky: low-accuracy yearling Limousin bulls, natural matings, 478 calvings, direct WW EPD between high and average bulls = 11.3 kg; Louisiana: high-accuracy Simmental bulls, AI matings, 120 calvings, direct WW EPD between high and average bulls = 9.2 kg). Realized differences for 205-d WW between high- and average-sired progeny were 13 kg (P<0.05) and 16 kg (P<0.01), respectively, for the Kentucky and Louisiana locations; however, these realized differences did not have a significant impact on subsequent pregnancy rate of the cow herd at either location. Cows weaning high- and average-sired calves had subsequent pregnancy rates of 93.3 and 96.6%, respectively, at the Kentucky location and 94.7 and 92.4%, respectively, at the Louisiana location.

(Key Words: Beef Cattle, Expected Progency Differenes, Pregnancy Rate, Weaning Weight.)

Introduction

Crossbred calves, which express greater weaning growth, nurse more frequently (Cartwright and Carpenter, 1961) and more aggressively (Kress et al., 1984) and obtain more milk from their dams (Reynolds et al., 1978; Short et al., 1996); this contributes to a longer postpartum interval (Browning et al., 1995) when compared with straightbred calves, which express less weaning growth. Also, bull calves, which also express greater weaning growth, tend to nurse more aggressively (Brink and Kniffen, 1996) than heifer calves, which again express less weaning growth. Because suckling stimulus delays return to estrus (Wyatt et al., 1977; Wettemann et al., 1978; Williams, 1990; Short et al., 1994), dams nursing bull calves tend to have longer postpartum (Bellows et al., 1982) and calving (Newman and Deland, 1991) intervals. Based on these results, it is conceivable that calves with above average weaning growth may actually stress their dams to the point at which subsequent pregnancy rate is impacted. The present study, conducted at two locations in the Southern Region, assessed impact of level of weaning productivity, as mediated through sire selection, on subsequent pregnancy rate of the cow herd.

Materials and Methods

The present study was conducted at two locations in the Southern Region--University of Kentucky, Lexington and Hill Farm Research Station, Louisiana State University Agricultural Center, Homer. Because protocol procedures involving calving season (late February to early April at Kentucky; late January to mid February at Louisiana), cow genetic type (*Bos tarsus*-influenced cows at Kentucky; *Bos indicus*-influenced cows at Louisiana), sire breed (Limousin at Kentucky; Simmental at Louisiana), and mating procedure (natural service

TABLE 1. Average weaning weight (WW) EPD (accuracy) for high and average Limousin (natural mating) and Simmental (AI mating) sires utilized, respectively, at the Kentucky and Louisiana locations.

	Kentucky		Louisiana	
Item	Sires (no.)	Average WW EPD (kg)	Sires (no.)	Average WW EPD (kg[a])
High	4	13.6 (NA)[b]	3	18.9 (0.88)[c]
Average	4	2.3 (NA)[b]	4	9.7 (0.90)[c]
Difference		11.3		9.2 (0.88)[c]

[a]Values are weighted by number of progeny weaned.

[b]NA = accuracy values were not available on the yearling bulls.

[c]Accuracy at time sires were selected for AI usage.

at Kentucky; AI at Louisiana) differed for the two locations, data were analyzed separately for the two locations.

Kentucky Location. Cattle were managed utilizing practices approved by the University of Kentucky Institutional Animal Care and Use Committee (IACUC #00390A2002). Cooperator-owned, spring-calving, grade Limousin cows (cows were classified as 0, 1/2, or 3/4 Limousin) were exposed to purebred Limousin sires selected on the basis of direct weaning BW (WW) expected progeny difference (EPD). One group of four sires was selected for the high direct WW EPD group, and the second group of four sires was selected for the average direct WW EPD. Mean WW EPD for the high and average sires differed by 11.3 kg (Table 1). The eight sires, all unrelated, were purchased as yearlings from a single source and were utilized in multi-sire breeding units for the duration of the study.

Cows ranged in age from 3 to 8 yr of age and were classified as 3, 4, and 5+ yr. During the second year of the study, a group of first-calf heifers (0, 1/2, 3/4 Limousin) with Angus-sired calves, obtained from another group of cows owned by the same cooperator, were added to the herd in an attempt to effectively utilize available pasture resources and sire usage.

Cows were assigned randomly to the high and average sire groups considering cow genetic type, cow age, calving date, and calf sex. The group of first-calf heifers added to the herd was allotted randomly to the two sire groups based on cow genetic type, calving date, and calf sex.

Cows were exposed to bulls for 65 d beginning in mid May each year. Within the high and average breeding groups, two bulls were utilized multi-sire, and pairs of bulls were rotated weekly or more frequently if deemed necessary, during the 65-d breeding season. Bulls were semen-checked each year prior to initiation of the breeding season. After the breeding season, cows from the two breeding groups were combined and managed as a single group until the next breeding season.

A total of 478 calves that survived to weaning were born from late February to early April in 1998, 1999, and 2000 and were weighed within 24 h after birth at which time bull calves were castrated. In early May, cows and calves were treated for internal parasites. Calves were vaccinated with a 7-way *Clostridia* vaccine, and cows were vaccinated for Infectious Bovine Rhinotracheitis (**IBR**), Parainfluenza 3 (**PI₃**), Bovine Virus Diarrhea (**BVD**), Bovine Respiratory Syncytial Virus (**BRSV**), Leptospirosis, and Campylobacteriosis. Cows were body condition scored using the 1- (emaciated) to 9- (obese) point scoring system described by Vizcarra and Wettemann (1996). Cows and calves were re-

treated for internal parasites at fall weaning, and calves were booster-vaccinated for *Clostridia* and IBR, PI₃, BVD, BRSV, Leptospirosis, and Campylobacteriosis. Horn flies were controlled with insecticide-impregnated backrubbers placed at strategic pasture locations.

Throughout the grazing season, cows were managed on tall fescue pasture overseeded with ladino clover. During the winter, cows received tall fescue and ladino clover hay fed for ad libitum intake. A complete mineral mix, which contained greater magnesium levels during the grass tetany season, was provided for ad libitum intake year round.

Calves sired by the high and average bulls were weaned in 1998, 1999, and 2000 at an average age of 205 d. Subsequent spring pregnancy rate for cows weaning the three sets of high and average calves was assessed by rectal palpation in fall 1999, 2000, and 2001, respectively. These pregnancy rates were subsequently confirmed when cows calved in 2000, 2001, and 2002, respectively. Nonpregnant cows were culled from the herd.

Data were analyzed using the PROC MIXED procedures of SAS® (SAS Inst., Inc., Cary, NC). The mathematical model for calf traits (Julian birth date, birth BW, 205-d BW) included fixed effects for sire genetic type (high or average), year (1998, 1999, or 2000), cow genetic type (0, 1/2, or 3/4 Limousin), cow age (3, 4, or 5+ yr), calf sex, and interaction between sire genetic type and calf sex. The mathematical model for cow traits [subsequent prebreeding body condition score (**BCS**), subsequent pregnancy rate (pregnant and nonpregnant cows were coded 1 and 0, respectively)] was the same as for the calf traits; however, year (1999, 2000, 2001) and cow age (4, 5, 6+ yr) increased by a factor of one.

Louisiana Location. Cattle were managed utilizing practices approved by the Louisiana State University Institutional Animal Care and Use Committee (IACUC #A97-40). Crossbred