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Abstract

Commercial beef heifers (n=1863) from 16 different sources were used to evaluate the influence of management practices and biological traits on first-service conception and overall pregnancy rates. Frame score, initial weight, overall ADG, body condition score, reproductive tract score, source, AI technician, and AI sire significantly influenced first-service conception. Overall pregnancy rates were influenced by frame score, body weight, and ADG.

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FACTORS INFLUENCING FIRST-SERVICE CONCEPTION AND OVERALL PREGNANCY RATES IN COMMERCIAL BEEF HEIFERS [1]

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Summary

Commercial beef heifers (n=1863) from 16 different sources were used to evaluate the influence of management practices and biological traits on first-service conception and overall pregnancy rates. Frame score, initial weight, overall ADG, body condition score, reproductive tract score, source, AI technician, and AI sire signifi c antly influenced first-service conception. Overall pregnancy rates were influenced by frame score, body weight, and ADG.

(Key Words: Beef Heifers, First-Service Conception, Pregnancy Rates.)

Introduction

Proper evaluation, selectio n, and management of replacemen t heifers are critical to the production and longevity of females in the cow herd. Heifers that c onceive early in their first breeding season have a greater potential to rebreed as cows, ensuring continued production in the herd. Our objective was to evaluate the influence of management and biological parameters on first-service conception and overall pregnancy r ates in heifers.

Experimental Procedures

To evaluate the effect of various management practices and biological traits on first-service conception and overall pregnancy rates, 1,863 heifers from six states and 16 sources were developed postweaning at a commercial heifer development facility in Southwest Nebraska. Initial body weight was measured when heifers entered the facility in early to mid-winter. A high roughage ration was limit-fed at a level s o heifers would reach 65% of their projected mature body weight before the breeding season began. Production data collected 35 to 40 days pre-breeding included fram e score, reproductive tract score (1=hi ghly developed, 6=infantile), and body condi tion score (1= thin, 9=obese).

The heifers were place d on a higher plane of nutrition 33 days before breeding. That plane was maintained through the first 21 days of the breeding season. Heifers were synchronized by fee ding .5 mg/hd/day melengesterol acetate (MGA) for 14 d ays, followed by a subcutaneous injection of prostaglandin (Bovilene®) 14 days after MGA withdrawal. A breeding body weight was measured at the time of injection. Heifers were inseminated artificially approximately 12 hours after estrus was first detected. Nonresponders were reinjected 9 days afte r the first injection. If no estrus was observed a f ter a third prostaglandin injection, heifers were inseminated at

72 hours post injection. First-service conception and overall pregnancy rates were determined by ultrasonography 35 to 45 days after the end of the 45-day breeding season. A final body weight was measured at that time. The difference between initial weight and final weight was used to calculate overall average daily gain (ADG).

A specialized statistical analysis (contingency tables) was used that allowed us to examine the influence of a single management factor or biological trait, while others were held constant. Because of the significant influence of heifer source, a separate analysis of heifers from a single source (n=507) was performed. A second statistical approach (mixed-model analysis) was used for the entire population (n=1863) to reduce the influence of source, technician, and sire.

Results and Discussion

As frame score increased, first-service conception (P=.16) and overall pregnancy rates (P<.10) tended to decrease (Figure 1). The contingency table analysis showed that heifers that gained 1 to 1.5 lbs/day had the highest first-service conception rates (Figure 2) and overall pregnancy rates (Figure 3). Daily gains above and below this range produced lower (P<.01) pregnancy rates. A quadratic response was observed as body condition score increased (P<.10), with a decline in first-service conception in either extremely thin or fat heifers (Figure 5). Reproductive tract score tended (P=.17) to influence first-service conception but not overall pregnancy rates (Figure 4). Heifers with infantile tracts, designated by a score of 6, had the lowest first-service conception rates when compared to those with scores of 1 through 5. The mixed model analysis found the fixed effects of body condition score (P<.0l; Figure 4) and reproductive tract score (P<.0l; Figure 5) to be significant. Interactions among ADG, frame score, breeding wt, prebreeding wt, body condition score, and reproductive tract score were significant, illustrating the impact of numerous factors on first-service conception.

Overall, heifers with frame score, body wt, body condition score, and ADG in the "moderate" range were more reproductively efficient. In addition, several factors interact to influence reproductive efficiency, demonstrating the importance of managing all contributing factors, rather than focusing on very few.
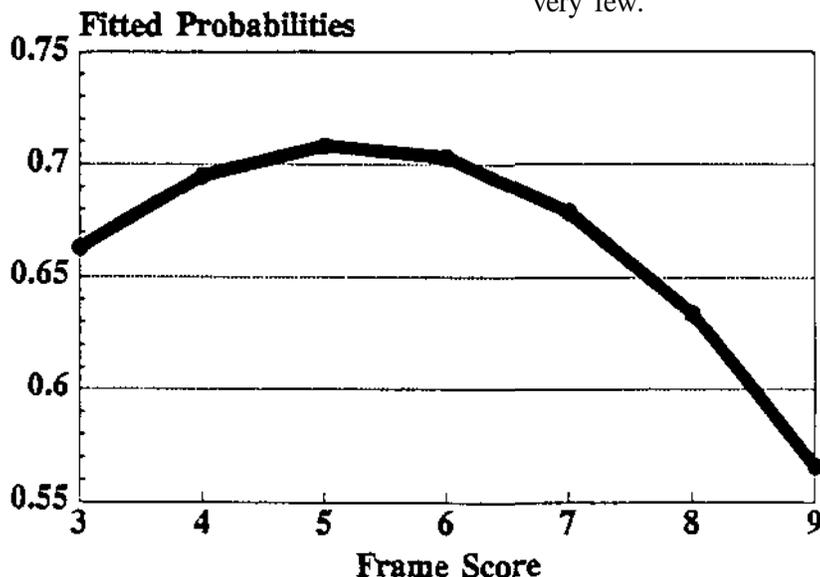

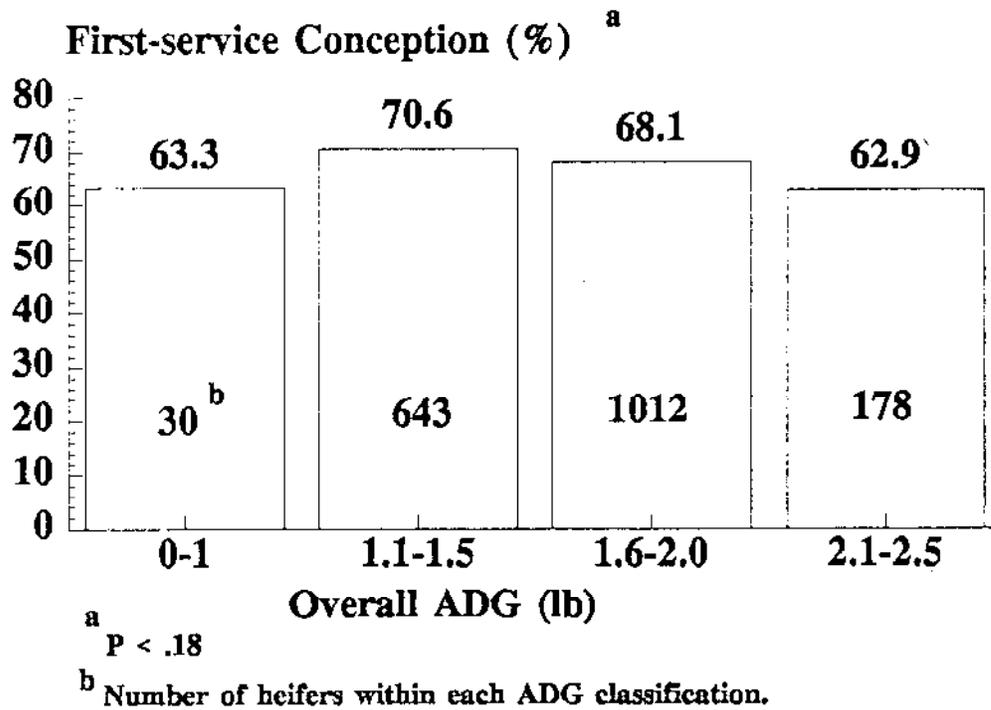**Figure 1. Influence of Frame Score on First-Service Conception**

First-service Conception (%) [a]

63.3	70.6	68.1	62.9
30 [b]	643	1012	178

Overall ADG (lb)

[a] P < .18

[b] Number of heifers within each ADG classification.

Figure 2. Influence of Overall Average Daily Gain on First-Service Conception

Overall Pregnancy Rate (%) [a]

80	91.9	87.5	83.7
30 [b]	643	1012	178

Overall ADG (lb)

[a] P < .01

[b] Number of heifers within each ADG classification.
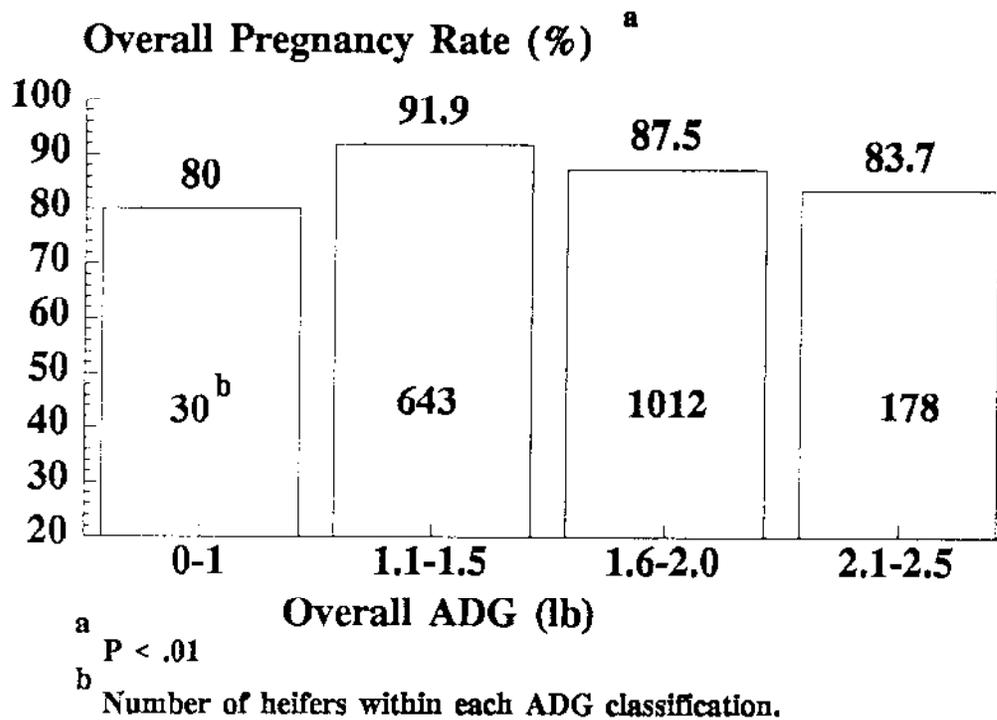
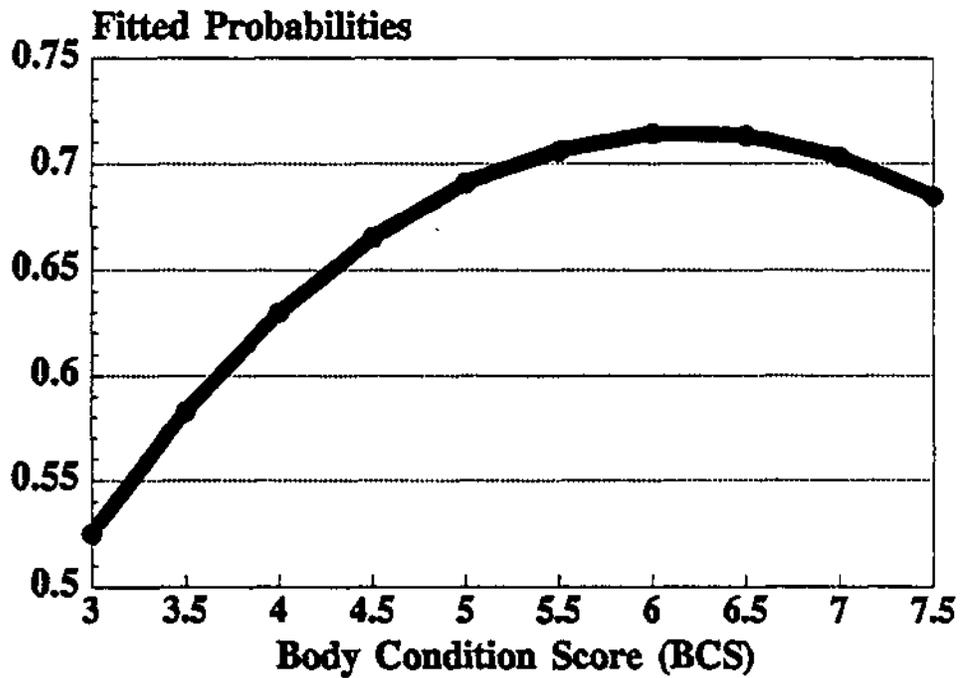Figure 3. Influence of Overall Average Daily Gain on Overall Pregnancy Rate

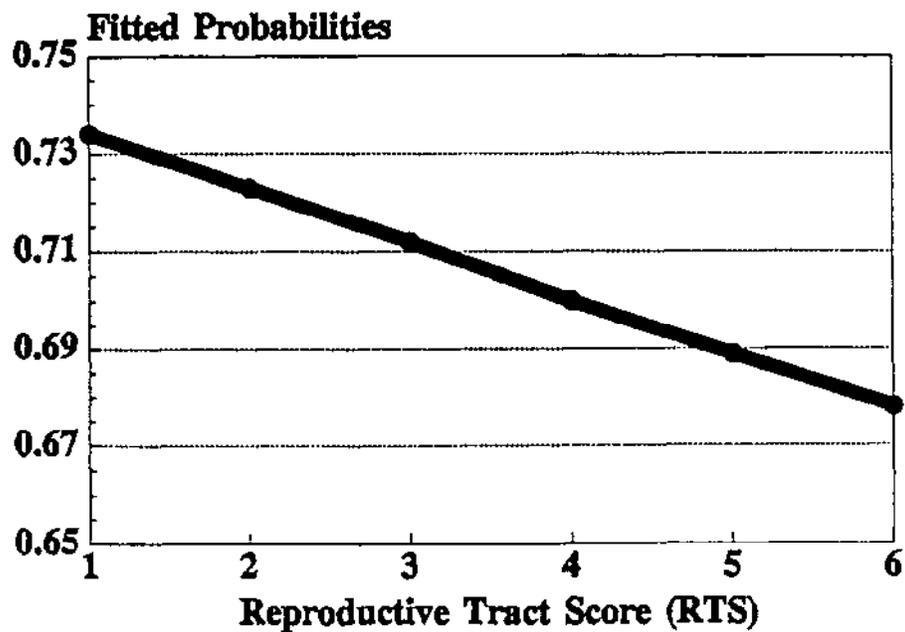Figure 4. Influence of Body Condition Score on First-Service Conception

Figure 5. Influence of Reproductive Tract Score on First-Service Conception