Reproductive Systems for North American Beef Cattle Herds

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KEYWORDS

• Beef cattle • Reproductive momentum • Postpartum anestrous
• Heifer development • Breeding soundness examination of bulls • Veterinary services

KEY POINTS

- A systems approach to beef cattle reproduction recognizes the diversity of interacting components that affect herd-level reproductive efficiency and that the whole system is more than the sum of its parts.
- The systems approach facilitates evaluating the flow of cattle through the herd population based on temporal changes in reproductive and production state.
- The previous year's timing of calving has either a positive or negative effect on the present year's reproductive success.
- The ability of cow herds to maintain a 365-day calving interval requires active management of the impact that age and body condition have on the length of postpartum infertility.

INTRODUCTION

A systems approach to beef cattle reproduction recognizes the diversity of interacting components that affect the number of calves weaned per cow present in the herd at the start of the breeding season, and the need to recognize that the whole system is more than the sum of its parts.[1,2] The systems approach facilitates an evaluation of the dynamic reproductive system in beef cow-calf herds by evaluating flow of cattle through the production unit based on temporal changes in reproductive and production state. An important concept within a systems approach to beef herd reproduction is the realization that the previous year's timing of calving has either a positive or

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negative effect on this year's reproductive success. This article defines herd momentum as the impact of historical reproductive outcomes on the subsequent herd reproductive performance.

CONSTRAINING BIOLOGICAL REALITIES AFFECTING BEEF REPRODUCTION

A few key facts regarding biological constraints of beef cow-calf production systems must be known to accurately model the flow of cows through several stages of reproduction:

- A reproductive system that optimizes beef cow-calf production requires that nutritional demands (primarily energy and protein) for mature (multiparous) cows that vary throughout the production year based on pregnancy and lactation status can be met by available grazed forage and body reserves with limited need for supplementation. This system requires that herd managers consider the timing of calving and peak lactation as well as mature cow size and lactation level relative to the nutrient levels present in available grazed forage.[3,4]
- In order to match the cow production cycle with the forage production cycle, it is necessary for beef cows to calve at about the same time each year (ie, at 365-day intervals).
  - Nutritional requirements vary throughout the production cycle with highest energy and protein requirements occurring during early lactation and the lowest requirements occurring during midgestation when the cows are not lactating.[5–7]
  - Nutrients available per acre of grazed forage vary throughout the year with highest levels coinciding with vegetative growth and lower levels occurring when plants are dormant.[8,9] The timing of highest forage productivity is influenced by the mixture of species and time of year.
  - Plotting lactation curves for cows with peak lactations of 4.5, 9.1, or 13.6 kg (10, 20, and 30 pounds) of milk production per day shows that high nutritional demands of lactation coincide with the breeding season when targeting a calving interval of 365 days (**Fig. 1**).

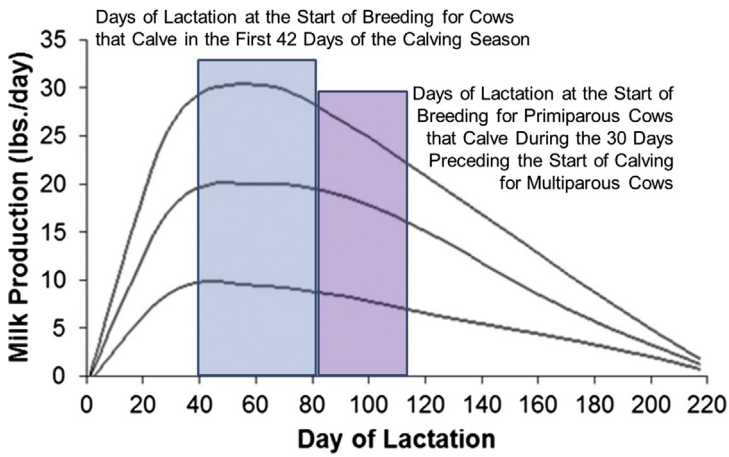

Fig. 1. Representative lactation curves for cows with peak milk yields at the 60th day of lactation of 4.5, 9.1, or 13.6 kg (10, 20, or 30 lb).