Reproductive performance of Jersey heifers submitted for first insemination based on age vs. body weight – a randomized controlled trial

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Introduction

Raising replacement heifers represents a major cost on a dairy farm. The ideal time to submit a heifer to insemination is a balance between reproductive biology, growth, and economics. While getting heifers pregnant sooner may reduce raising costs, it may compromise their future productive performance. The objective of this study is to compare the reproductive performance of Jersey heifers submitted for first insemination (AI) based on age vs. body weight (BW). We hypothesize that the reproductive performance of heifers moved to the breeding pen (BP) based on a minimum BW would not be inferior to that of heifers moved based on minimum age.

Materials and methods

This field trial was performed on one commercial farm (3,400 milking cows) located in California from April 2022-February 2023. An observational retrospective study was previously performed using heifer data collected at the same farm from 2014-2020. The lowest quartile of BW at first AI (< 480 lb) was associated with decreased milk yield (~4 lb/d; P < 0.05) in early lactation than other BW categories. This BW threshold was used to define a field trial to assess 2 management strategies. At 9 mo of age, animals were allocated to a CON or TRT group. Allocation was blocked by dsort (Individual Animal Management execution tool; FHMS) category (LGH: light vs. HVY: heavy) performed at 60-90 d old. In all allocated heifers, eligibility for the first AI was assessed every 4 wk: TRT heifers were weighed from allocation until eligible (≥ 480 lb); CON heifers were moved to BP at a minimum of 12 mo old, independent of BW. Animals entering the BP received one dose of PGF2α and were bred to estrus (tail paint) with sexed semen. Logistic regression and survival analysis were used to assess first AI, pregnancy at first AI, and overall pregnancy. Full models included the effect of treatment, dsort and their interaction.

Results

Results are presented with LSM, OR, HR (95% CI), and median time to (MT) events. Of the animals included (n = 418), 36% were LGH. Of the TRT (n = 217), 32% were moved before 12 mo. The odds of being bred (OR:1.4 [0.3-6.3], P = 0.7), pregnant at first AI (OR:1.1 [0.8-1.7], P = 0.5), and overall pregnancy (OR:1.3 [0.7-2.3], P = 0.4) were not different between groups. An interaction of treatment by dsort was detected in time to move to BP and to first AI (P < 0.001), with significant differences observed within the HVY group. In the HVY group, time to move to BP (HR 1.7 [1.3 - 2.2]; MT: CON = 379 d, TRT = 350 d), to first AI (HR = 2.4 [1.9-3.1]; MT: CON = 387d, TRT = 351d) and time to pregnancy (HR = 1.5 [1.1- 1.9]; MT: CON = 393d, TRT = 370d) was reduced in the TRT vs. CON groups (P ≤ 0.004).

Significance

Submitting heifers to first AI based on BW reduced time to pregnancy, decreasing their rearing period and associated costs. Future first lactation performance should be evaluated before adopting management change.