THE EFFECT OF HEAT STRESS ON THE INSEMINATION RESULTS IN DAIRY COWS

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Heat stress is a significant challenge affecting dairy cow performance, particularly reproductive success. This study evaluated the impact of heat stress on insemination outcomes using 512,801 insemination records from 5780 cows collected between 2002 and 2024. The univariate logistic regression was used for statistical analysis. As a result, a temperature-humidity index (THI) below 59 had no significant effect on success rates. However, from THI 59 onwards, a progressive decline was observed, becoming statistically significant ($p < 0.05$). At THI ≥ 62, the odds of pregnancy dropped sharply, with success rates decreasing from 28.0% at THI 60 to 14.7% at THI 76. Heat stress significantly reduced pregnancy odds at all evaluated time points relative to insemination ($p < 0.001$). Compared to non-heat stress conditions, odds ratios (OR) for pregnancy remained consistently below 1 (range: 0.558–0.641; all $p < 0.001$), indicating a strong negative association. The most pronounced effect occurred two days before insemination (OR = 0.558, 95% CI: 0.526–0.592), followed by insemination day (OR = 0.587, 95% CI: 0.553–0.622) and seven days before (OR = 0.606, 95% CI: 0.603–0.680). The effect persisted from 21 days before to over 21 days after insemination, highlighting the prolonged impact of heat stress on fertility. In conclusion, these findings highlight that heat stress exposure during the peri-insemination period significantly reduces reproductive success in dairy cows, underscoring the need for improved management strategies to mitigate its effects during this critical period.