OLDS COLLEGE OF AGRICULTURE & TECHNOLOGY | TECHNOLOGY ACCESS CENTRE FOR LIVESTOCK PRODUCTION

Technology Access Centre for Livestock Production (TACLP)

Replicate Study: Handling acclimation procedures prior to breeding improved reproductive performance, handling reactivity and stress in beef heifers

This replicate study aimed to confirm if handling acclimation – a combination of repeated non-aversive handling and positive feed reinforcement prior to breeding – would lead to calmer heifers and a greater pregnancy rate previously demonstrated in 2020 (project funded by NSERC).

INTRODUCTION

Two new groups of heifers – one raised at Neilson Cattle Development and the second from external ranch sources – were evaluated while following the same protocol developed for the 2020 study.

This applied research project aimed to improve overall herd reproduction efficiency and animal welfare by conditioning beef heifers (using positive feed reinforcement) prior to breeding to perceive human-animal interaction and handling facilities as non-aversive stimuli.

OBJECTIVES

Compare the reproductive performance and reactivity at handling from heifers subjected to acclimation to handling procedures prior to the breeding season (acclimated group) against non-acclimated heifers (control group).

Images: Neilson Cattle Development

STUDY DETAILS

- Conducted in the 2021 breeding season at Neilson Cattle Development in Stettler, AB.
- 122 heifers aged 13-14 months were assessed; 38 heifers raised at Neilson's operation and 84 heifers purchased from external ranch sources.
- All heifers were housed as one single herd on pasture for approximately six months prior to the commencement of the experiment.
- Heifers were ranked by initial body weight prior to the breeding season, and equally allocated to four groups (2 groups per treatment). Each group was in a separate feedlot pen and was randomly assigned to "acclimated group" or "control group".
- Every other day (two-week period) a person familiar to the animals walked inside the feedlot pens of the acclimated groups talking softly while pail feeding heifers with a small feed supplement (approximately 100 grams per heifer as-fed basis); their regular diet was offered daily by using a feed truck. Additionally, they were run through the chute on three separate days with feed rewards immediately after handling (positive reinforcement). Heifers in the control groups were fed by feed truck without any human interaction, and were not exposed to handling acclimation procedures prior to breeding.
- Heifers were accessed by a veterinarian prior to trial to confirm cycling status.
- Pregnancy rate was evaluated via ultrasonography after the end of breeding season.
- Cattle reactivity to handling was assessed in all heifers using the chute score (a single trained observer categorized the animal based on its excitability while enclosed in the squeeze chute) and flight speed methods (measuring the speed of each heifer while exiting a hydraulic squeeze chute right after weighing the animal).

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RESULTS

- **Acclimated heifers had an increment (P = 0.06) on pregnancy rate of 10.84% when compared to the control group independent of their ranch source.**
- **By adopting the handling acclimation procedures, heifers are also shown to have 7.5 times increased chances (representing a probability of 88.3%; P = 0.06) of becoming pregnant compared to the control group.**
- Currently, the Neilson's operational capacity is approx. 1,000 head per year. Based on findings, adopting the handling acclimation proposed by the TACLP would lead to an increase of 91 calves weaned per year (estimation considering a percentage of preweaning mortality of 4.5% meaning calves born dead or that died within the first 24 hours of life).
- Handling acclimation reduced handling reactivities of home-raised heifers at Neilson Cattle Development (lower flight speed, P = 0.02), but not heifers from external sources (P > 0.10).
- Heifers from external ranch sources that showed more excitable behavioral responses in the chute (chute score) were also more excitable (faster) while exiting the chute (P < 0.01).

FUTURE RESEARCH

- More studies are recommended, particularly to better understand the differences in the behavioural responses observed post-acclimation between home-raised heifers at Neilson Cattle Development and heifers from different ranch sources.
- This study also highlights the need for finding a single method of behavioural assessment (more suitable and objective) with higher sensitivity than the two methods used (chute score and flight speed). The new method should capture the distinct characteristics (innate and momentary fearfulness agitation) of adult cattle, and at the same time be significantly associated with economical traits, such as pregnancy rate.

Treatment	Pregnant	Non-pregnant	P-value[1]
Acclimated Group	59 (98.33%)	1 (1.67%)	0.06
Control Group	55 (88.71%)	7 (11.29%)	
Increment on pregnancy rate (%)[2] (Acclimated vs. Control)	**10.84%**		

[1] *P-value considered significant at P < 0.10 (Fisher's exact test).*

[2] *Increment on pregnancy rate = [(pregnancy rate acclimated – pregnancy rate control/pregnancy rate control] × 100*

Note: The 2020 study showed an improvement of 2.23% in the pregnancy rate for the acclimated group compared to the control group. The increase of pregnancy rate from 2.23% to 10.84% in the 2021 study may be connected to the extended advising and training made by the TACLP to Neilson Cattle Development on basic low-stress handling techniques as well as cattle's perception and behaviour.

Learn more at oldscollege.ca/TACLP.