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

Technology Access Centre for Livestock Production (TACLP)

Comparing the Effects of Weaning Methods and Tactile Stimulation on Calf Performance, Health and Welfare

Two-year research study at Neilson Cattle Development near Stettler, Alta. to help the TACLP identify the most appropriate management procedures from birth to weaning for optimal growth and animal welfare that will benefit the Canadian beef industry by minimizing pre and post-weaning morbidity and mortality – directly increasing the profitability of the herd.

INTRODUCTION

Compare differences in growth performance, health and reactivity at handling in **tactile stimulated (TS)** calves against **non-tactile stimulated (NTS)** calves during the pre-weaning and post-weaning phases which was performed by either **nose-flap (NF)**, **fenceline (FL)** or traditional **abrupt weaning methods (CTNF and/or CTFL)**. Additionally, the incidence (and/or severity) of nasal abrasions on calves subjected to the NF weaning were recorded.

OBJECTIVES

Year 1 (2020): Growth performance, health and welfare of calves weaned using FL or NF methods were compared against CTNF and CTFL.

Year 2 (2021): Adopting a novel handling procedure on 1-day old calves (tactile stimulation) was combined (or not) with either NF, FL or CTNF weaning methods.

Tactile stimulation: Consisted of applying a (massage-like) gentle stroking in calves for 1 minute (immediately after processing them) in order to mimic mothering behaviour in the form of licking on its offspring; tactile stimulated calves were reunited with their mothers immediately after the procedure; non-tactile stimulated calves were reunited back to their mothers immediately after processing them.

STUDY DETAILS

Animals & Sampling Days:

- **Year 1:** A total of 102 Angus and crossbred Angus beef steers and heifers (aged 8-9 months) were assessed prior to weaning (d -12 & -5), at weaning (d 0), and up to 42 days post-weaning (d 7, 14 & 42). All calves were creep-fed in pasture prior to weaning.
- **Year 2:** A total of 83 Angus and crossbred Angus beef steers and heifers were evaluated over two phases: [1] at 1-day of age and [2] prior to weaning at 7-8 months of age (d -5), at weaning (d 0), and up to 48 days post-weaning (d 7, 12 & 48). Calves were not creep-fed in pasture prior to weaning.

Treatments:

Year 1:

- *Nose-flap* (NF; n = 25): Calves were fitted with a commercial anti-sucking plastic device for a 5-d period while housed together in their home pasture with their mothers prior to permanent physical separation *(Figure 1)*.
- *Fenceline* (FL; n = 26): Calves were moved to a single feedlot pen adjacent to their mothers' pasture being physically separated by a fence (but able to see and hear each other) for a 5-d period prior to permanent separation.
- *Abrupt weaning* (used as control, CT): Cow-calf pairs were physically separated from each other at the same occasion as FL (CTFL; n = 25) or NF (CTNF; n = 26) calves. The CTNF were kept unweaned for the 5-day period that NF calves had the nose device. Both CTFL and CTNF cow-calf pairs were not able to see or hear each other after physical separation.

Year 2:

- **1st phase:** One single occasion (1 min) of either TS (n = 42) or NTS procedure (n = 41; used as control) was applied on 1-day old calves immediately after the processing management procedures – meaning birthweight recording, injections, vaccination and band castration procedure *(Figure 2)*.
- **2nd phase:** Calves were equally distributed by sex and tactile stimulation treatment, and randomly allocated to be weaned by either FL (n = 24), NF (n = 21), or CTNF meaning cow-calf pairs were permanently separated from each other at the same occasion the NF group (n = 23), totaling 68 calves.

Figure 1. Calf subjected to NF weaning method restrained in chute immediately prior to removal of a commercial anti-sucking plastic device.

Figure 2. TS performed in a single occasion (1 min) in a 1-day old beef calf while restrained in a portable restraining system.

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STUDY DETAILS *(continued)*

Measurements:

- **Year 1:** Individual body weight and average daily gain were used as indicators of performance. The crush score and exit speed methods were used as indicators of excitability at handling. The incidence of clinical health issues (# of animals with nasal discharge, ocular discharge & diarrhea) was recorded prior to and up to 42 d post-weaning. The incidence of calves that presented injuries in the nasal septum was recorded and categorized based on the severity of the skin lesion (adapted from Lambertz et al., 2015), being score of 0 (no visible skin lesion) and up to 6 (nasal septum perforation).
- **Year 2:** Growth performance, excitability at handling and the incidence of nasal abrasion were measured (same as year 1).

MOST RELEVANT RESULTS

Under conditions and management at Neilson's operation, the FL method and adoption of the TS in 1-day old calves showed some overall benefits in regards to calf performance and/or health and welfare.

- **Year 1:** Calves under CTFL and FL methods were in average 36.3 ± 7.29 lbs heavier (P < 0.05) at weaning day (d 0) when compared to both CTNF and NF. Although not significant (P > 0.05), calves weaned by CTFL and FL methods were 20 and 26 ± 14.5 lbs, respectively, heavier than NF calves. In addition, FL calves had the least numerical (P > 0.05) incidence of nasal discharge while both NF and CTFL had intermediary, and CTNF had the greatest number of cases *(Table 1)*. The NF method resulted in notable and severe injuries in the nasal septum, some of which were observed up to 14 days after removal of the nose-flap device. According to our findings, 76% (19/25) of the animals had slight bleeding and/or eschar; 16% (4/25) of animals had deep and/or open purulent wound with some of them including nasal septum perforation; and only 2% (2/25) of the calves had no visible skin lesion. Not significant (P > 0.05) differences were observed on reactivity at handling indicators among the weaning treatments.

Item	Fence-line	CTFL	Nose-flap	CTNF
Nasal discharge	1	4	8	3
Ocular discharge	1	1	0	2
Diarrhea	3	4	1	3
Totals	5	9	9	8

Table 1. Number of incidences of clinical health issues observed from d -5 to 42 post-weaning in beef calves weaned by FL, NF, or permanent cow-calf separation at the same occasion CTFL or CTNF.

- **Year 2:** TS calves were 47 lbs heavier (P < 0.01) than NTS prior to weaning *(Figure 3)*. Although not significant (P > 0.05), NTS calves that showed at least one sign of health complication prior to weaning requiring health treatment (such as pneumonia, eye discharge, cough & scours) was 20% greater than TS calves. Calves weaned by the FL gained (P < 0.05) an additional 2.7 ± 0.76 lbs/d than nursing CTNF calves during the pre-weaning (5 days of physical separation) period *(Figure 4)*. No differences (P > 0.05) were observed on reactivity at handling between TS and NTS calves. Overall, NF group was numerically (P > 0.05) more excitable at handling than FL and CTNF groups in post-weaning period.

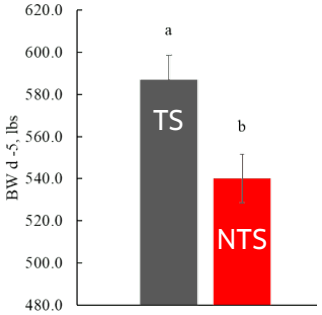

Figure 3. Least square means (± SEM) of body weight (lbs) obtained prior to weaning (d -5) in beef calves previously subjected to a single occasion (1 min) of TS or NTS procedure at 1-day of age; a-b means followed by different letter differ at P < 0.05.

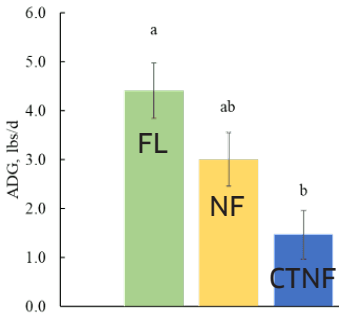

*Figure 4. Least square means (± SEM) of average daily gain (lbs/d) obtained prior to weaning (from d -5 to 0) in beef calves subjected to either FL, NF, or permanent cow-calf separation at the same occasion as nose-flap (CTNF). *Means followed by different letters differ at P < 0.05.*

CONCLUSION & FUTURE RESEARCH

The FL method showed more beneficial effects than other weaning methods, under conditions and management at Neilson's operation, due to overall improvement observed on health and growth indicators. Note in year 1, all calves were creep-fed prior to weaning which could have caused the lack of differences on growth performance in this particular year between FL and abrupt weaning, but not in year 2 (more studies are recommended). In addition, the high incidence and severity of nasal abrasions observed after removal of the nose-flap devices indicate the welfare of animals was compromised. Therefore, it is recommended the nose-flap should not be considered as a "low-stress" weaning method. The adoption of a standardized tactile-stimulation process 24-h after birth showed some benefits improving the live weight and health of beef calves prior to weaning.

Further studies will be performed using a larger sample size including behavioural and physiological indicators of stress as well as the nutritional status of the calves (as a proxy of cow's milk yield) and assessing the genetic component (sire) of each calf.