

Agricultural Research Foundation
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TITLE: Tradition vs Technology: Comparing Stress in Cattle by Using Conventional and Traditional Methods

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EXECUATIVE SUMMARY:

Calf processing is a highly debated topic that deals with calf health and welfare, which is pertinent to every Oregon cow-calf operation. Within the first three months of the life, calves are typically roped and restrained before they are given an ear tag for identification, vaccinated, and branded with a hot iron. At that point, young bulls are castrated. The debate typically revolves around regional boundaries where what is done within that region is right or the best option. Many of these cultural restraint methods were developed from the capacities and skills of the original developers and continue as traditions passed down to each new generation. This debate was exaggerated as technology advanced and the introduction of squeeze chutes and calf tables became main stream in production systems. While this debate has raged on for decades, little scientific evidence is available to aid with this discussion. Having a broader understanding of how each of these restraint methods affect calves at this critical time is desperately needed especially with the societal pressures of humane livestock handling continuing to put pressures on this industry. This research looks to start the scientific process of evaluating how each of these main restraint methods compare to one another at the time of branding. Understanding these interactions will enable producers the ability to evaluate the

best methods for their operation and have the scientific evidence to justify their decision to the general public.

OBJECTIVES:

1) Compare the effects of stress on calves at the time of processing with the four most common calf restraint methods; 1 – Heel only, separated from cows (HOS), 2 –Head and heel, separated from cows (HHS), 3 – Head and heel, cows and calves together (HHT), and 4 – Calf table, separated from cows (CTS).

2) Monitor stress of the herd and individual at the time of the procedure and follow calves through the feedlot and processing to evaluate production differences after animals leave the ranch.

PROCEDURES:

Forty eight cow calf pairs from one ranch were separated into four groups of 12 and randomly assigned to a treatment group; 1 – Heel only, separated from cows (HOS), 2 –Head and heel, separated from cows (HHS), 3 – Head and heel, cows and calves together (HHT), and 4 – Calf table, separated from cows (CTS). Pairs were gathered and baseline respiratory rate and blood cortisol was collected one week prior to treatments being applied. Blood samples were placed on ice until sampling was completed, then immediately spun in a centrifuge to separate the serum. Serum was transferred into a clean container and frozen to be sent for analysis. Calves were branded and processed according to their treatment order on June 22nd 2018. Expert livestock handlers and ropers were used and remained the same across all treatments to minimize handler bias. Treatments that required calves to be separated were moved into a holding corral where calves were separated from the cows and moved into the branding trap or squeeze chute depending on treatment. Calves that stayed with the cows during the treatment were moved into a small paddock adjacent to the handling facilities to allow adequate space to accommodate the additional animals comfortably. Once animals were restrained, branding, vaccinations, dehorning, and castrations were done as needed. Immediately after all processing procedures were complete, respiratory rate and blood cortisol were collected. All sampling was done under the direct supervision of Jim England, University of Idaho's State Extension Veterinarian. Blood samples were again treated the same as baseline samples. Calves were reunited with calves, if needed, and turned out into an adjacent pasture upon completion of each treatment. All animals were monitored by the owner for the following week post treatment.

During processing, 30-45 second videos were recorded at the beginning, half way, and at the end of each treatment group. With these videos, tail swishing, movement, and vocalizations were scored to assess stress indicators in the herd as a whole. Scoring was done by the primary investigator after processing was completed. Because this evaluation is on the entire group, all

information gleaned cannot be deemed repeated and therefore is included as anecdotal information only.

SIGNIFICANT ACCOMPLISHMENTS:

Processing data was collected as planned. Blood serum was sent to an independent lab for cortisol testing and was completed March 2019.

Respiratory rate across the treatments ranged from 36-84 breaths per minute during the baseline sampling (average 61) and 50-90 after processing (average 69). While respiratory rates rose slightly, this increase appears to be equally noticeable in each group (Figure 1) and had no scientific significance ($p=0.23$).

Blood cortisol, measured in nanograms per milliliter (ng/mL), ranged from 3.1 to 36 ng/mL (average 11) and 3.5 to 60.8 ng/mL (average 21.9)

in the baseline and treatment samples respectively. Variance in cortisol levels (Treatment-Baseline) was also widely varied with a range of -12.5 to 56.6 ng/mL with the HHT group standing out as significantly lower than the rest ($p>0.01$). Because of this drastic difference, we also evaluated baseline and processing data separately to see if there was sampling error which demonstrated that cortisol levels at baseline sampling were fairly uniform ($p=0.62$) and statistically significant at time of treatment ($p=0.016$), suggesting that keeping the cows with the calves and head and heeling remarkably reduced the measurable stress on calves (Figure 2).

Video footage was evaluated and ranked in three categories for both calves and cows; vocalizations, tail swishing, and movement. Each was ranked between 1 (none) and five (continual). All of the values were added together giving a possible range of 18 (all 1's) to 90 (all 5's). Sums by group were 52, 46, 33, and 42 for HOS, HHS, HHT, and CTS respectively with each category being fairly equal in the number of points awarded (Table 1). Because this information was evaluated at the group level, we were unable to run any statistical models, though this anecdotal evidence appears to support the blood cortisol findings that the head and heel group with cows exhibits the least amount of stress indicators as a group. Ropers also

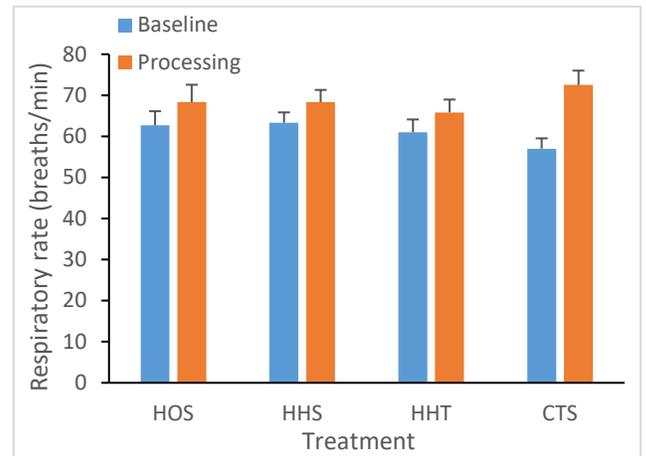


Figure 1 Respiratory rates by treatment group before and after processing.

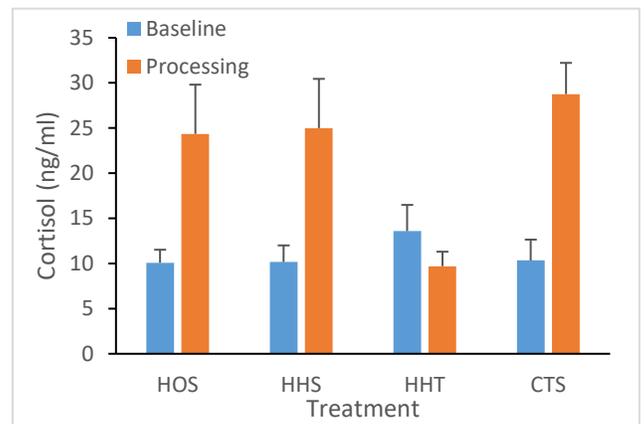


Figure 2 Blood cortisol (ng/mL) by treatment group before and after processing.

commented on the effectiveness of roping with this group as animals were not as alert to/wary of the handlers and the swinging of the lariat.

BENEFITS & IMPACTS:

Our study demonstrates that there may be differences in stress on cattle by restraint method. We want to reiterate that all handling and roping was done by personnel deemed experts in this field; therefore, the roping results may vary greatly depending on the individual person/team. This study can also be utilized to demonstrate that, when done properly and by good hands, roping calves at branding can actually be less stressful than other alternatives.

During the course of this study, an undergraduate student intern by the name of Audrey Marchek was able to assist in sample collection and data analysis. She and Sergio Arispe are looking to present this study, in poster form, at a regional or national beef conference this summer. This study also sparked the interest of Audrey and she would like to do a follow up study for her senior project at Kansas State University. She is working with OSU extension to develop this study and will utilize her family's livestock in the Vale OR area.

ADDITIONAL FUNDING RECEIVED DURING PROJECT TERM: None

FUTURE FUNDING POSSIBILITIES:

This study has demonstrated that there is more to be learned about animal restraint methods and stress of livestock. The investigators have had discussions with representatives of Phibro and Boehringer Ingelheim about other study opportunities around this topic.

Table 1. Summation of stress factors taken on cows and calves from 3 videos of each treatment.

	Vocalization	Tail Swish	Movement	Total
HOS	20	18	14	52
HHS	19	13	14	46
HHT	9	12	12	33
CTS	14	15	13	42