The Professional Animal Scientist 32 (2016):658–664; http://dx.doi.org/10.15232/pas.2015-01450

Effects of nose flap devices applied to calves on cow and calf performance, carcass traits, and heifer fertility

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ABSTRACT

The effects of calf nose flap (NF) presence and duration on dam performance, steer carcass traits, and subsequent heifer fertility were evaluated. Angus and Angus × Hereford primiparous cows (n = 245) and calves at 2 locations were allocated to treatments: (1) NF for 30 or 31 d, removal from dam on d 30 or 31 (LT-30R); (2) NF for 4 or 5 d, removal from dam on d 30 or 31 (ST-30R); (3) NF for 4 or 5 d, removal from dam on d 60 or 62 (ST-60R); and (4) no NF, removal from dam on d 30 or 31 (CON-30R). Among ST-60R cows, BCS was reduced (P < 0.05) on d 60 or 62 and change in cow BCS from d 0 to 60 or 62 was greater (P < 0.05) than all other treatments. At both locations, LT-30R calves gained less (P < 0.05) by d 30 or 31 than other treatments. However, there was a location × treatment interaction (P < 0.05) for calf BW where ST-30R and ST-60R calves gained less (P < 0.05) than CON-30R calves at one location, possibly due to differences in forage quality and availability. Subsequent pregnancy rate among CON-30R heifers (that had been calves in the prior year) were (P = 0.05) reduced versus other treatments. Results indicate both presence and duration of NF weaning devices can reduce preseparation calf BW gain, but use of NF in calves can improve subsequent-year heifer reproductive performance without affecting steer carcass quality.

Key words: body condition score, beef calf, carcass trait, nose flap, two-stage weaning

INTRODUCTION

Beef cattle weaning methods in the United States commonly include sudden separation of calves from their dams. Removing calves from cows, and therefore halting lactation, decreases cow energy requirements and allows them to begin improving in BCS. Because pregnancy rates are greater in cows maintaining moderate BCS or rising toward moderate at breeding (Houghton et al., 1990), it is important to allow adequate time for cows to reach proper condition to conceive another pregnancy.

Cow BCS increases and same year pregnancy rates improve as calf age at weaning decreases (Myers et al., 1999). However, it can be useful to continue the use of milk from the dam as a beneficial supplement to growing calves. Therefore, it is important to equally consider both cow and calf gains to optimize performance in the weaning process. Several weaning methods have been studied to observe their effects on cow and calf performance after weaning (Price et al., 2003; Enríquez et al., 2010). One method included the use of nose flap (**NF**) weaning devices, which inhibits the nursing of calves while continuing to allow them to consume feed and water. Traditionally, NF have been used for a period of 4- to 7-d followed by separation from the dam. However, they may serve as a useful tool in alternative weaning strategies, including decreasing cow milk production during normal nursing and weaning calves while they remain with their dams for an extended period of time.

The objectives of this study were to (1) examine the effect of NF device use on cow and calf performance, (2) evaluate the duration of NF use on cow and calf performance, and (3) examine the effect of NF on subsequent heifer fertility and steer carcass traits.

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MATERIALS AND METHODS

Experimental Design and Treatments

This experiment was conducted following Colorado State University Animal Care and Use Committee approval at the Eastern Colorado Research Center. The experiment was a completely randomized design. Two pasture locations (within 40 km of Akron, CO) consisting of dryland native range were used for this study, containing herds consisting of 153 (location 1) and 92 (location 2) primiparous Angus and Angus × Hereford cows and their calves (225.2 ± 17.7 d of age). Based on pregnancy diagnosis and calving records, pregnant cows and their calves were randomly assigned by dam and calf breed, calf age, and calf sex to 1 of 4 treatments at each location: (1) NF for 30 or 31 d (long term; LT) while remaining with dam followed by removal (R) from dam to a feedyard on d 30 or 31 (**LT-30R**, n = 62), (2) NF for 4 or 5 d (short term; ST) while remaining with dam followed by removal from dam to a feedyard on d 30 or 31 (**ST-30R**, n = 61), (3) NF for 4 or 5 d while remaining with dam followed by removal from dam to a feedyard on d 60 or 62 (**ST-60R**, n = 61), and (4) no NF while remaining with dam followed by removal from dam to a feedyard on d 30 or 31 (**CON-30R**, n = 61).

On d 0, cow-calf pairs were gathered, and calves in LT-30R, ST-30R, and ST-60R treatment groups were fitted with QuietWean NF (JDA Livestock Innovations Ltd., Saskatchewan, Canada) and returned to their dams (Table 1). On d 4 or 5, depending on location, cow-calf pairs were again gathered and NF were removed from the ST-30R and ST-60R groups. On d 30 or 31, cow-calf pairs were gathered, NF from LT-30R group were removed, and LT-30R, ST-30R, and CON-30R were separated from dams and placed in feedyard pens. The ST-60R group remained on pasture with their dams until d 60 or 62, depending on location. Cow BCS as described by Wagner et al. (1988) and BW were collected on d 0, 60, or 62, and 120 or 122. Cow s.c. fat thickness (cm) at the 12th rib was measured by ultrasound on d 0 and 60 or 62. Calves were weighed on d 0, d 30 or 31, and d 60 or 62.

Postweaning Animal Management

When calves were removed from dams and placed in the feedyard, calves were placed on a growing diet for 30 d (Table 2). Among these calves, heifers (n = 123) were then placed on pasture for 150 d until AI using an estrous synchronization protocol that included a controlled internal drug-release insert (**CIDR**; EAZI-BREED CIDR, 1.38 g of progesterone, Zoetis, Florham Park, NJ) for 5 d, 100 μg of gonadotropin-releasing hormone (Factrel, Gonadorelin, Zoetis) i.m. at CIDR insertion, and 25 mg of prostaglandin $F_{2\alpha}$ (Dinoprost tromethamine, Lutalyse, Zoetis) at CIDR removal. Heifers were inseminated and given 100 μg of gonadotropin-releasing hormone 72 h after CIDR removal. Bulls were placed with heifers 10 d after AI for a 60-d period. Heifers were diagnosed for pregnancy 85 d after AI to determine approximate age of the fetus, pregnancy rate to AI, and overall season-long pregnancy rate. A small group (n = 21) of replacement heifers were selected, and those not chosen as replacements were sold as pregnant heifers. Age at calving and calving season distribution were collected among replacement heifers the following year.

After the 30-d growing period, steers (n = 113) were placed on cornstalks for 135 d. Yearling weight was collected at approximately 1 yr of age, and steers were placed on pasture for an additional 150 d before being brought back to the feedyard to be finished. One steer died while on pasture, and 15 steers were sold based on inadequate growth performance. Remaining steers (n = 97) received a finishing diet (Table 2) for 120 d before being slaughtered. Hot carcass weights were collected at slaughter, and the following carcass characteristics were measured 24 h postmortem: (1) USDA YG, (2) USDA QG, (3) s.c. fat thickness over the 12th rib, and (4) rib-eye area.

Statistical Analyses

Data for cow BCS, BW, and fat thickness and calf BW were analyzed as a completely random design with a mixed model using the PROC Mixed procedure of SAS (v. 9.2; SAS Institute Inc., Cary, NC) and accounting for cow and calf breed, calf sex, and calf sire. Cow or calf was the experimental unit because the NF treatment was applied directly to calves (and thus their dams) in the same pasture in which different treatments were administered, and location (i.e., pasture)

Table 1. Schedule of weaning treatments applied to calves, including nose flap (NF) administration and removal from dam

	Day of experiment			
Treatment[1]	0	4 or 5	30 or 31	60 or 62
LT-30R	NF in	—	NF out, calf R	—
ST-30R	NF in	NF out	Calf R	—
ST-60R	NF in	NF out	—	Calf R
CON-30R	—	—	Calf R	—

[1]ST = short term, LT = long term; LT-30R = NF for 30 or 31 d while remaining with dam, calves removed (R) on d 30 or 31; ST-30R = NF for 4 or 5 d while remaining with dam, calves removed on d 30 or 31; ST-60R = NF for 4 or 5 d while remaining with dam, calves removed on d 60 or 62; CON-30R = no NF while remaining with dam, calves removed on d 30 or 31.