

# Evaluation of reproductive performance and herd longevity when heifers grazing native range are vaccinated with a lifetime regimen of a killed viral or modified live viral vaccine

E. A. Melchior\*, S. L. Rosasco\*, S. L. Lodge-Ivey\*, S. H. Cox‡, R. L. Dunlap‡, J. C. Wenzel†, D. M. Hallford\*, A.F. Summers\*, and E. J. Scholljegerdes\*

\*Department of Animal and Range Sciences, New Mexico State University, ‡ Corona Range and Livestock Research Center, New Mexico State University, † Department of Extension Animal Sciences and Natural Resources, New Mexico State University

## Abstract

Fifty-eight Angus × Hereford cross cows born in spring of 2015 were randomly assigned to treatments of receiving a modified-live viral (MLV) or killed viral (KV) vaccination against bovine viral diarrhea virus (BVDV) at 60-d of age to determine the effects of vaccination on fertility and herd longevity. As heifers, animals received this vaccine treatment again at weaning (205d), at re-vaccination and for the duration of their time in the herd. Blood samples were collected every two weeks prior to breeding to assess puberty attainment and were subsequently subjected to ovarian ultrasonography to measure antral follicle counts (AFC) and reproductive tract score (RTS). Heifers were synchronized utilizing the 7-d CIDR-PG protocol with AI following estrus detection. Heifer AFC, uterine horn diameter, RTS, and proportion of females attaining puberty before the breeding season were similar among treatments ( $P \geq 0.38$ ). Artificial insemination pregnancy rates, final pregnancy rates and percentage of heifers that calved in the first 21 days were similar between vaccination treatment groups ( $P \geq 0.19$ ). Cows receiving a MLV vaccination remain in the herd in similar proportion to those receiving a KV vaccination ( $P = 0.86$ ). These results indicate that different vaccination strategies can be successfully used in beef cattle grazing native range without impacting fertility, or herd longevity.

## Hypothesis

Heifers vaccinated with a modified-live viral vaccination will have improved reproductive performance and herd longevity than heifers vaccinated with a killed viral vaccination.

## Objectives

Determine if heifers vaccinated with a lifetime regimen of a modified live viral vaccine have increased herd longevity compared with heifers vaccinated with a killed viral vaccination.



## Materials and Methods

- 58 commercial Angus × Hereford 2015-born heifers were randomly assigned a lifetime treatment of MLV (Bovishield 5 Gold FP/ VL5, Zoetis Inc.) or KV (Cattlemaster 4 FP/ VL5, Zoetis Inc.) vaccination beginning at 60-d of age.
- Cows continue to receive vaccination treatment at October pregnancy diagnosis.
- Blood samples were collected every two weeks prior to breeding to assess puberty attainment (Henricks et al., 1971).
- Ovarian ultrasonography was performed 45-d prior to breeding to measure antral follicle counts uterine horn diameter, and reproductive tract score (Martin et al., 1992).
- Heifers were synchronized using a 7-d CIDR-PG protocol followed by estrus detection and AI.
- Artificial insemination, final pregnancy rates were determined via blood sample.
- Experiment was conducted as a completely randomized design.
- Data were analyzed using the PROC MIXED procedure of SAS 9.4 (SAS Institute, Cary, NC) with vaccine treatment as the fixed effect.
- Survival analysis for herd longevity was performed using the LIFETEST procedure of SAS 9.4.

## Results

Table 1. Influence of vaccination type (KV or MLV) on reproductive performance parameters prior to the first breeding season.

Item	Treatment		SEM	P-value
	KV	MLV		
Antral Follicle Count	29.2	26.1	2.7	0.41
Uterine Horn Diameter, mm	7.6	7.4	0.7	0.86
Reproductive Tract Score	4.9	5.0	0.1	0.38
% Mature BW at breeding	55	57	2	0.47

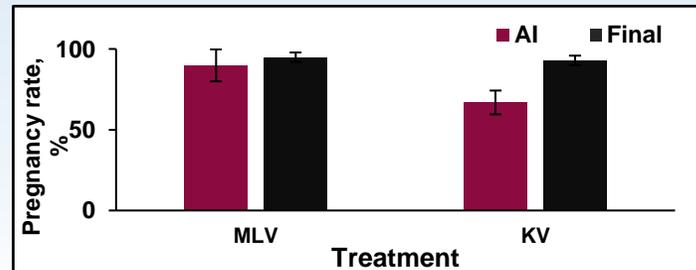


Figure 1. Influence of vaccination type (KV or MLV) on first pregnancy rate of beef heifers. No differences were determined between AI pregnancy rate or final pregnancy rate ( $P \geq 0.19$ ).

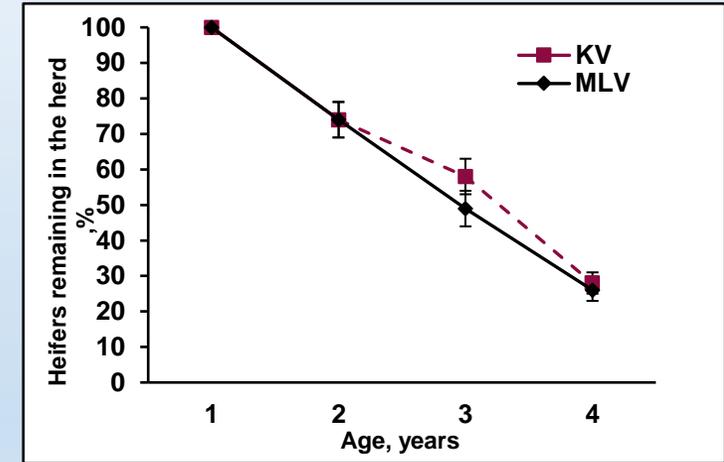


Figure 2. Influence of vaccination type (KV or MLV) on herd survival. Proportions of cows receiving a KV or MLV vaccination are similar ( $P = 0.86$ ) after producing their third calf.

## Conclusions

- Reproductive success and herd longevity is not influenced by vaccination type when cows are grazing native rangeland.
- MLV vaccination with fetal protection did not impact conception rate or fertility.
- Producers may utilize either vaccination type appropriately without disrupting reproductive competence of their cows.

## Literature Cited

Henricks, D. M., D. R. Lamond, J.R. Hill, and J.F. Dickey. 1971. Plasma progesterone concentrations before mating and in early pregnancy in the beef heifer. *J. Anim. Sci.* 33: 450-454.  
 Martin, L. C., J.S. Brinks, R.M Bourdon, and L.V. Cundiff. 1992. Genetic effects on beef heifer puberty and subsequent reproduction. *J. Anim. Sci.* 70: 4006-4017.  
 Givens, M.D., M.S. Marley, C.A. Jones, D. T. Ensley, P. K. Galik, Y. Zhang, K. P. Riddell, K. S. Joiner, B.W. Brodersen, and S. P. Rodning. 2012. Protective effects against abortion and fetal infection following exposure to bovine viral diarrhea virus and bovine herpes virus 1 during pregnancy in beef heifers that received two doses of a multivalent modified-live virus vaccine prior to breeding. *J. Am. Vet. Med. Assoc.* 241: 484-495