COLD &

Effects of Cold Stress on Marbling

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Overview:

We conducted a multi-phase study in the winter of 2014 at A to Z Feeders in Atlantic, Iowa to determine the impact of our all-natural feed additive, Matrix, on carcass traits in Wagyu crossbred finishing cattle. Although the study was focused on Matrix, we gleaned some highly valuable information regarding the damage that severe cold stress can inflict on marbling.

71 head of the original 151 head of cattle that had started on the study and had not yet been harvested were exposed to blizzard-like conditions over the final 2 weeks prior to harvest. Cattle were housed in open lots and were either in the treatment or control group just as their 80 previous pen mates who had been harvested 2 weeks earlier had been. The 151 head were fed and managed identically during the entire finishing phase until the final 40 days at which time they were randomly allocated to either the treatment or control groups. One group (40 hd from each pen) was on test for 26 days prior to harvest and the other group (35 and 36 hd) was on test for 40 days prior to harvest.

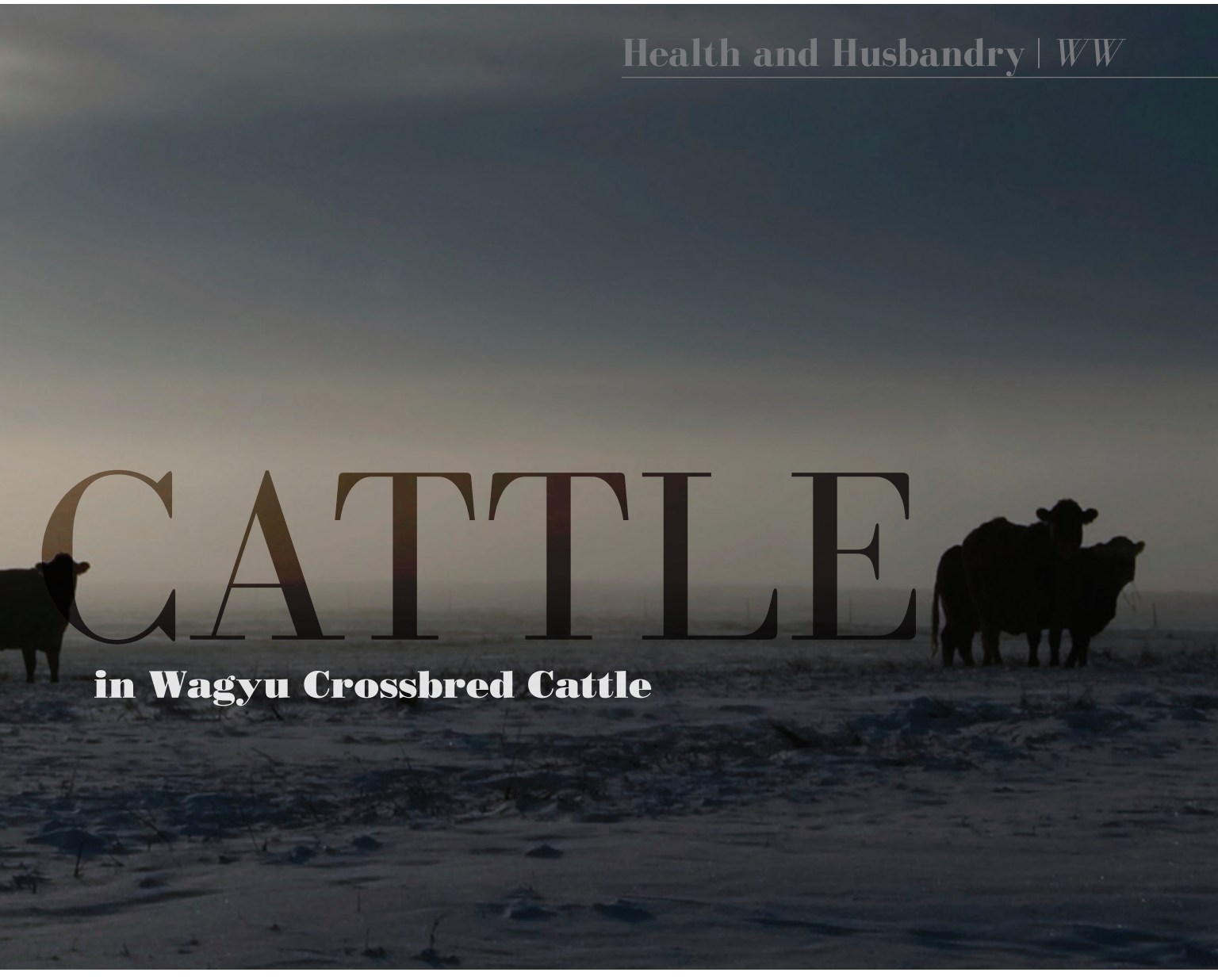
Cattle were comprised of 151 head of Wagyu x Angus F1 heifers. Live weights at harvest were between 1300-1400 lbs after being on feed for either 409 or 423 days. Age at harvest was approximately 22 months. All animals received a pre-harvest finishing total mixed ration with treatment group animals receiving 1 oz. of Matrix through a daily topdress. Cattle were exposed to blizzard-like conditions during the final 14 days pre-harvest (mean temp 22°F with a low of 8°, mean wind speed 17 mph with a high of 43 mph, rain and snow accumulation, open lots, no shelter).

Results:

		Marbling Score 26d Groups	Marbling Score 40d Groups
Treatment Grp	**No.**	**Pre-Cold Stress**	**Post-Cold Stress**
CONTROL	76	460	406a
MATRIX	75	507	469b

a,b – means with different superscripts are significantly different at P<.053

Cattle in the control group (no Matrix) had marbling scores which were 54 units or 11.7% lower post-cold stress. Cattle in

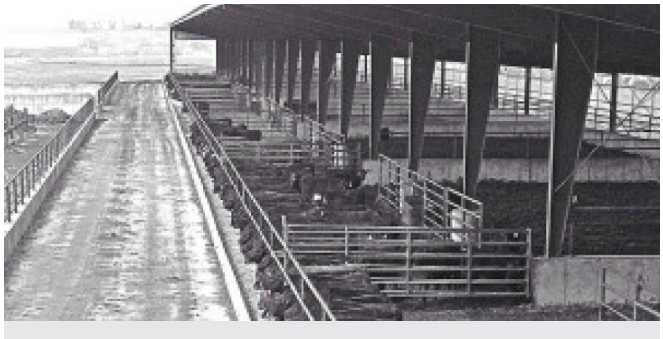


CATTLE

in Wagyu Crossbred Cattle

the treatment group (with Matrix) had marbling scores which were 38 units or 7.5% lower post-cold stress. Matrix enhanced marbling scores over the final 26 and 40 days pre-harvest, 10.25% and 15.5%, respectively. However, both groups whether receiving Matrix or not when exposed to severe cold stress during the final 14 days pre-harvest, had lower marbling scores though Matrix prevented up to 36% of the overall loss.

Summary:
Feeding Matrix for 40 days pre-harvest can significantly increase marbling scores of Wagyu crossbred cattle by as much as 15.5%. Exposure to severe cold stress over a 14 day period prior to harvest in Wagyu crossbred cattle can reduce marbling scores up to 11.7% without Matrix and 7.5% with Matrix. Matrix appears to be a viable, all-natural feed additive for improving and preserving marbling in beef cattle during the finishing phase yet there is no substitute for adequate shelter during harsh winter conditions to minimize effects of environmental stress on beef quality.



Notes:
A to Z Feeders is one of the only custom cattle feeding facilities in the U.S. to offer a mono-sloped, finishing barn for Wagyu cattle.

MATRIX® is an all-natural feed additive comprised primarily of natural vasodilators and host-specific beneficial bacterial strains developed and manufactured by Protocol Technologies, Inc.

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