Determination of the economic benefit of a Strategic Deworming combined with an Anabolic Implant Program for Cow/Calf operations in western Canada

Introduction

Strategic deworming is a management program to minimize pasture contamination and limit the exposure to parasite larvae by grazing cattle. Cattle are dewormed prior to turnout in the spring; a second deworming occurs 5-6 weeks after grazing begins but before overwintered parasite larvae that the cattle have ingested have had time to mature and begin shedding eggs, re-contaminating the pasture. Another deworming may be necessary depending on the length of the grazing season.

It is estimated that less than 30% of nursing calves receive an anabolic implant prior to weaning[1], yet numerous trials reported over the past 40 years have shown implanting calves increases average daily gain approximately 5% and can have a 30:1 return on investment[2, 3].

Implanting and deworming are additive in terms of performance gain. This trial established the value of performance enhancing technologies and the premiums that producers need to recover to offset the production loss incurred by not using performance enhancing technologies in nursing calves.

Objective:

To determine the economic benefit of a Strategic Deworming program combined with an anabolic implant program for Cow/Calf operations in western Canada

Trial Design:

- Trial was conducted at the Western Beef Development Centre, Lanigan, Saskatchewan
- 100 cow calf pairs (68 heifer calves, 32 steer calves) were selected from a pool of 102 candidates.
- Approximately two weeks prior to the start of the trial calves were vaccinated with VISTA® ONCE SQ and VISION® 7 SOMNUS; cows were vaccinated with VISTA® 5 SQ.
- Calves were allocated to one of four treatment groups:
    - Control – no deworming, no implant
    - Control/Ralgro- no deworming, implanted with Ralgro Day 0
    - Safe-Guard® – cows and calves dewormed; calves - no implant
    - Safe-Guard/Ralgro – cows and calves dewormed; calves implanted with Ralgro Day 0
- Day -1: Cows and calves were weighed. Calves were sorted by sex and ranked by weight; one calf from each pair based on weight ranking was randomly allocated to either the Safe-Guard group or the Control group.
- Within the Safe-Guard and Control groups, calves were again sorted by sex and ranked by weight. One calf from each pair based on weight was randomly allocated to either the implanted group (Ralgro Day 0) or the non-implanted group.
- Day 0: Cows and calves were re-weighed; the average of the weight Day -1 and Day 0 was the Start of Trial weight used for all calculations. Cows and calves allocated to the Safe-Guard group were treated with Safe-Guard Suspension 10% oral drench (5 mg/kg body weight = 2.3 ml/100 lbs.)
- Fecal Egg Counts – samples collected from 20 calves and 20 cows in both the non-dewormed and Safe-Guard treated groups and submitted to a commercial laboratory for fecal egg counts
    - Day 0, Day 14, Day 35, Day 56, & Day 109
- Pasture productivity
    - During the grazing season, cow-calf pairs in the Safe-Guard treatment group and Control group were allocated to different rotationally grazed paddocks. The paddocks had similar grass and legume species and were rotated at similar production stages. At each rotation, five (5) randomly distributed quadrats (0.25 m^2) were clipped to assess available forage yield as pairs entered and exited each pasture. A composite sample from the initial pasture, the mid-summer pasture and the last pasture rotation was submitted to a commercial laboratory to determine pasture forage quality.
- Pasture Deworming
    - Five weeks following turn-out (Day 35) 1kg of Safe-Guard Premix 20% (fenbendazole 200 mg/g) was added to 25 kg of Right Now® Emerald Mineral (CAN). This provided enough fenbendazole to treat 50, 1765 lb, cow calf pairs at label dose.
- Weaning
    - Cows and calves weighed at approximately the same time on two consecutive days; the average of the two weights was the End of Trial weight and used in all calculations. Fecal samples were collected from 20 cows and 20 calves from the Safe-Guard and Control groups on the last weigh day.
    - Cow calf pairs were on pasture for 109 days.
- Animal Health
    - There were no mortalities in either group during the grazing season. One heifer calf in the Control group did not respond to repeated treatment for footrot, subsequently the cow calf pair was removed from the trial.

Results:

The cows had had been treated in the fall with a generic ivermectin pour-on. Pre-turnout the cows had been in a drylot feeding program. Fecal egg counts of the cows were in the moderate to high range at the beginning of the trial (Table 1). The calves had a low egg count. They had not acquired a patent infection; the eggs found were likely from coprophagy. Fecal samples collected 14 days post-treatment had fecal egg count reduction in the dewormed cows of 100%, while the fecal egg count of the control cows dropped by 47.5%. The reduced fecal egg count of the control cows is due to the increased fecal output that occurs when cattle are turned out on lush pasture.

Day 35 pre-treatment samples, the control cows had a moderate egg count while the dewormed cows still had a low egg count. The mineral medicated with Safe-Guard offered to the cows and calves in the treated group was consumed in 5 days.

Day 56, 3 weeks after the medicated mineral was offered to the dewormed group, fecal egg count reduction was 66.7% for the cows and 92.3% for the calves. The fecal egg count of both the cows and calves were extremely low prior to deworming and even lower following deworming. The timing of deworming fulfilled the strategic deworming criteria; the larvae ingested by the cows and calves during the initial 5 weeks of the grazing season had not matured and begun shedding eggs The control cows had a moderate fecal egg count and the control calves had a low fecal egg count on Day 56.

Other factors that may have influenced the fecal egg count are: reduced pasture contamination with parasite larvae as the cow/calf pairs were on pastures where cattle had been strategically dewormed the previous two grazing seasons; and the productivity of the pastures was greater this year than in the past 2 years due to abundant rainfall (parasite larvae don't normally climb up the plant more than 4" – 6", if grasses are 12" - 16" tall very few larvae will be ingested[5]).

At weaning the cows and calves in the treated group had a low fecal egg count while the egg count of the cows in the control group had dropped to a low count indicating immune suppression of parasite egg shedding; the calves had a moderate fecal egg count. During the grazing period the fecal egg count of the treated calves was lower than the control calves (P>0.05) but the counts were both in the low range prior to the weaning samples.

Table 1. The Interpretation of Fecal Worm Egg Counts using The Modified Wisconsin Sugar Flotation Technique[4]

CATEGORIES	LOW	MODERATE	HIGH
Cows	5 or less	5 - 20	>20
Calves	10 or less	10 - 50	>50

Table 2. Fecal Egg Counts (eggs/3 grams) and Fecal Egg Reductions During Grazing Season

Day of Trial		Cows		Calves	
		Control	Safe-Guard	Control	Safe-Guard
Day 0	*Induction Treatment*	18.3	20.3	1.6	0.3
Day 14	*Post Treatment*	8.7	0	5.8	1.6
	Fecal Egg Count Reduction		*100%*		
Day 35	*Pre-Treatment*	9.9	1.2	5.4	1.3
Day 56	*Post-Treatment*	15.4	0.4	6.5	0.1
	Fecal Egg Count Reduction		*66.7%*		*92.3%*
Day 109	*Trial Termination*	4.3	0.2	11.3	3.7

Pasture Productivity and Rotations

There was no difference in forage yield (Kg/ha) between the rotational pasture grazing systems; and paddocks were rotated at a consistent productivity level (P> 0.05). There was no difference in the nutritive value of the forage between the pastures (P> 0.05).

Calf Performance: Safe-Guard vs Control (Table 3)

Table 3. Pasture Performance Safe-Guard vs Control

	Control		Safe-Guard			
Number	Steers	Heifers	Steers	Heifers	SE	*P*-value
	16	33	16	34		
Initial Weight (lb)	272.50	221.68	271.63	223.35		
Average Weight (lb)	238.28		237.63		8.2251	0.9833
Final Weight (lb)	517.66		528.56		12.8520	0.3855
Pasture Gain	279.38		290.93		6.0835	0.0763
Average Daily Gain	2.56		2.67		0.0578	0.0719

There was a trend for improvement in average daily gain of the calves in the Safe-Guard group, 2.67 lbs. per day vs. 2.56 lbs. per day (P=0.0763). The calves in the Safe-Guard Group gained 11.55 lbs. more during the grazing season. Two thirds of the calves allocated to the trial were heifers, the difference in gain between the steers and heifers during the grazing season (steers in the Safe-Guard group gained 0.23 lbs a day more than the heifers, steers in the control group gained 0.16 lbs/day more than the heifers) modified the average pasture gain in this trial.

Calf Performance: Ralgro vs Control (Table 4)

Implanting calves at turn-out increased average pasture gain 25.6 lbs. over the grazing season *(P=0.0000)*. The result is consistent with previous studies substantiating the advantage of implanting nursing calves[2].

Table 4. Pasture Performance Ralgro vs Control

	Control		Ralgro			
Number	Steers	Heifers	Steers	Heifers	SE	*P*-value
	16	33	16	34		
Initial Weight (lb)	266.72	219.74	277.41	223.51		
Average Weight (lb)	235.1		240.8		7.9461	0.5099
Final Weight (lb)	507.4		538.6		11.9050	0.0125
Pasture Gain	272.3		297.9		5.5981	0.0000
Average Daily Gain	2.50		2.73		0.5140	0.0000

Calf Performance: Ralgro, Safe-Guard, Ralgro and Safe-Guard vs Control (Table 5)

Table 5. Ralgro, Safe-Guard, Ralgro/Safe-Guard vs. Control

	Control		Safe-Guard		*P*-value
	Control	Ralgro	Control	Ralgro	
N	24	25	25	25	
Initial Weight (lb)	233.3	243.1	236.8	238.5	0.9894
Final Weight (lb)	501.0	533.7	513.6	543.5	0.1134
Gain lb (lb)	267.7^{c}	290.6^{ab}	276.8^{bc}	305.0^{a}	0.0001
ADG (lb/day)	2.46^{c}	2.67^{ab}	2.54^{bc}	2.80^{a}	0.0002

Calves in the strategic dewormed group not implanted with Ralgro were an average of 9.1 lbs. heavier at weaning which was not significantly different than the control calves (P>0.05). The calves implanted with Ralgro, not part of the strategic deworming group, weighed 22.9 lbs. more at weaning (p=0.0001). The calves implanted with Ralgro that were part of the strategic deworming group weighed 37.3 lbs. more at weaning (p=0.0001).

Economics:

Based on Saskatchewan calf prices (CanFax: October 10, 2014, Issue 41)

- The average value of the calves in the non-dewormed group was $283/CWT, the average value of the strategically dewormed calves was $279/CWT. Treatment cost for the Safe-Guard Suspension and Premix was $9.72 a cow/calf pair. The net return to deworming in this trial was $22.37 per calf in the strategically dewormed group.
- The average value of the calves that were not implanted was $285/CWT, the average value of the implanted calves was $275/CWT. Ralgro was priced at $1.75 per implant. The net return to implanting in this trial was $68.65 per calf in the implanted group a 40:1 return on investment.
- The average value of the calves that were not dewormed, not implanted was $286/CWT, the average value of the dewormed, implanted calves was $276/CWT. **The net return to deworming and implanting in this trial was $91.48 per calf.**

Conclusion:

The use of common technologies in cow/calf production is cost effective.

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