



Comparison of Pyramid® 5 versus Express™ 5 in Feedlot Calves

Summary

In a 251-day (average days on feed across all blocks) study, 3,264 crossbred steer calves (average initial weight, 519 pounds) were evaluated based on morbidity, mortality, feedlot performance and carcass characteristics. The calves were given one of two respiratory viral vaccine treatments. The vaccine treatments were the following:

1. Pyramid 5, days 0 and 140
2. Express 5, days 0 and 140

Initial Undifferentiated Fever (UF) treatment was reduced ($P = 0.02$) 30% for Pyramid 5 compared to Express 5 (Table 1). The actual number of calves treated for Initial UF was 89 for Pyramid 5 and 127 for Express 5. Incidence rate for First UF Relapse was not different ($P = 0.80$) between the vaccine treatments. However, due to a higher initial UF treatment rate for Express 5, the number of UF Relapses for Express 5 was 60 versus 43 for Pyramid 5. Rates for Initial No Fever (NF) treatment and First NF Relapse were numerically improved for Pyramid 5 compared to Express 5, but statistical differences ($P = 0.15$ and 0.18 , respectively) were not achieved between the vaccine treatments. Overall Chronicity and Overall Wastage rates were not statistically different ($P = 0.64$ and 0.40 , respectively) between the vaccine treatments, but in both cases were numerically reduced for Pyramid 5 versus Express 5.

Mortality observations (Overall, Bovine Respiratory Disease, Hemophilosis, Metabolic, Arthritis, Miscellaneous) between the vaccine treatments were not statistically different (P values ranged from 0.41 to 1.00). Incidence of Bovine Respiratory Disease mortality was reduced 21% for Pyramid 5 versus Express 5 (Table 2).

Dry matter feed intake and average daily gain (live weight and carcass weight basis) were not affected (P values ranged from 0.25 to 0.82) by vaccine treatment (Table 3). Feed conversion (live weight basis) was significantly ($P = 0.05$) improved for Pyramid 5 compared to Express 5. The same trend was observed for feed conversion (carcass weight basis), but a statistical difference ($P = 0.19$) did not occur between the vaccine treatments.

For the majority of carcass characteristics measured, no statistical differences ($P \leq 0.05$) were observed between vaccine treatments (Table 4). However, Yield Grade 3 carcasses were increased ($P = 0.02$) for Express 5 versus Pyramid 5.

Overall, financial results for Pyramid 5 were improved compared to Express 5 (Tables 5 and 6). Utilizing a live sale model, Pyramid 5 vaccinated cattle returned an additional \$3.48 per head versus Express 5 (Table 5). When comparing Pyramid 5 to Express 5 on a formula sale basis, an additional \$7.96 per head was received for cattle vaccinated with Pyramid 5 (Table 6).

Important Conclusions

1. Pyramid 5 reduced Bovine Respiratory Disease treatment rates compared to Express 5.
2. Feed conversion was improved for Pyramid 5 versus Express 5.
3. Financial results were improved for steers given Pyramid 5 on a live sale and carcass sale basis compared to Express 5.

Experimental Methods

Treatments:

1. Pyramid 5 (IBR, Types I and II BVD, BRSV, PI₃) days 0 and 140
2. Express 5 (IBR, Types I and II BVD, BRSV, PI₃) days 0 and 140

Treatment Replication:

Five pens of 275 to 398 head per treatment; a total of 3,264 steers and ten pens

Treatment Assignment:

Randomized complete block design; five blocks of two pens

Steers were allotted (individually by random number) within truckload to one of two vaccine treatments.

All weights were taken on a pen basis with the exception of initial trial weights and carcass weights, which were individual weights. Initial trial weights were adjusted to pay weights on a proportional basis.

Cattle Description:

Three thousand two hundred sixty-four crossbred steer calves were received from auction markets throughout the United States. Steers allocated to the study were approximately 12 months or younger and weighed an average of 519 pounds.

Experimental Procedures

As part of the initial processing, steers at day 0 were:

- identified individually and by pen/lot number via ear tag
- given assigned vaccine treatment
- administered the following products
 - ≈ seven-way clostridial plus *Haemophilus somnus* vaccine
 - ≈ pasteurella vaccine (*haemolytica* and *multocida*)
 - ≈ growth implant
 - ≈ injectable antibiotic as a prophylaxis
 - ≈ pour-on endectocide

Chlortetracycline and sulfamethazine were each fed at 350 mg/head/day according to label directions in the starter diet.

Feedlot animal health personnel were blinded to vaccine treatment.

Composition of finishing diet (100% DM basis):

Dry rolled corn	42.52%
High moisture corn	37.02%
Corn silage	10.00%
CDGS	7.00%
Finisher supplement	3.46%
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	100.00%

At day 140, steers were reprocessed and received a second dose of their assigned vaccine treatment and a growth implant.

Steers were harvested within replicate during October through November, 2004.

Feedlot performance, health and carcass characteristics were summarized and statistically analyzed.

Cost of production, live and carcass financials were calculated.

Study Schedule and Investigator

Start Date:	February, 2004
End Date:	November, 2004
Investigator:	Feedlot Health Management Services
Location:	Broken Bow, NE

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TABLE 1. MORBIDITY SUMMARY

Item	Vaccine Treatment		Relative Risk ^a	P-value
	Pyramid 5	Express 5		
Head, n	1632	1632		
Initial UF ^c Treatment, n	89 (5.45) ^b	127 (7.78)	0.70	0.02
First UF Relapse, n	43 (48.31)	60 (47.24)	1.05	0.80
Initial NF ^d Treatment, n	106 (6.50)	128 (7.84)	0.83	0.15
First NF Relapse, n	38 (35.85)	61 (47.65)	0.76	0.18
Overall Chronicity ^e , n	81 (4.96)	87 (5.33)	0.93	0.64
Overall Wastage ^f , n	60 (3.68)	69 (4.23)	0.87	0.40

a Relative risk is the ratio of disease incidence in the Pyramid 5 group divided by the disease incidence in the Express 5 group.

b Numbers in parenthesis are percentages.

c UF = undifferentiated fever (see definition below).

d NF = no fever (see definition below).

e Chronicity = animals receiving maximum number of treatments (four) in protocol for disease (UF, NF).

f Wastage = animals designated as chronic that did not die during study. Animals sold for salvage or regular harvest (reduced target outweigh).

TABLE 2. MORTALITY SUMMARY

Item	Vaccine Treatment		Relative Risk ^a	P-value
	Pyramid 5	Express 5		
Head, n	1632	1632		
Overall Mortality, n	57 (3.49) ^b	57 (3.49)	1.00	1.00
BRD ^c Mortality, n	23 (1.41)	29 (1.78)	0.79	0.41
Hemophilosis ^d Mortality, n	4 (0.25)	2 (0.12)	2.00	0.42
Metabolic Mortality, n	14 (0.86)	13 (0.80)	1.08	0.85
Arthritis Mortality, n	0 (0.00)	1 (0.06)	N/A	1.00
Miscellaneous ^e Mortality, n	16 (0.98)	12 (0.74)	1.33	0.54

a Relative risk is the ratio of disease incidence in the Pyramid 5 group divided by the disease incidence in the Express 5 group.

b Numbers in parenthesis are percentages.

c BRD = bovine respiratory disease.

d Hemophilosis = Haemophilus somnus infection.

e Miscellaneous = mortality due to causes other than BRD, Hemophilosis, metabolic or arthritis.

UF Diagnosis:

1. absence of abnormal clinical signs associated with organ systems other than the respiratory tract
2. animal has rectal temperature $\geq 104.5F$
3. no previous history for NF or sick at feedlot arrival

UF Relapses:

1. animals returned to original feedlot pen following UF treatment that are subsequently selected as sick by feedlot animal health personnel
2. absence of abnormal clinical signs associated with organ systems other than the respiratory tract

NF Diagnosis:

1. absence of abnormal clinical signs associated with organ systems other than the respiratory tract
2. animal has rectal temperature $\leq 104.4F$
3. no previous history for UF or sick at feedlot arrival

NF Relapses:

1. animals returned to original feedlot pen following NF treatment that are subsequently selected as sick by feedlot animal health personnel
2. absence of abnormal clinical signs associated with organ systems other than the respiratory tract

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TABLE 3. FEEDLOT PERFORMANCE

Item	Vaccine Treatment		P-value
	Pyramid 5	Express 5	
Pens, n	5	5	—
Head, n	1632	1632	—
Initial Weight, lb	520	518	0.47
Hip Height, in	44.4	44.5	0.71
Days on Feed, d	251	251	1.00
Dry Matter Intake, lb/d	19.28	19.45	0.25
ADG, lb/d ^a			
Live Weight Basis ^b	3.25	3.26	0.82
Carcass Weight Basis ^c	3.32	3.31	0.64
Feed/Gain ^a			
Live Weight Basis ^b	5.93	5.97	0.05
Carcass Weight Basis ^c	5.81	5.87	0.19

a Deads out.
b Live weight minus 4% shrink.
c Carcass weight divided by 63.0%

TABLE 4. CARCASS CHARACTERISTICS

Item	Vaccine Treatment		P-value
	Pyramid 5	Express 5	
Carcass Weight, lb	835	835	0.96
Dressing Percentage ^a	63.94	63.80	0.65
Yield Grade, %			
1	12.56	8.77	0.26
2	43.45	41.91	0.63
3	35.27	38.87	0.02
4	8.28	9.86	0.62
5	0.44	0.59	0.57
Quality Grade, %			
Prime	4.94	5.34	0.84
Choice	78.51	78.66	0.92
Select	14.68	13.98	0.80
No Roll	1.87	1.63	0.66
Standard	0.00	0.39	0.08
Heavy Carcasses, %	1.19	0.78	0.48

a Carcass weight divided by shrunk live weight.

TABLE 5. FINANCIAL ANALYSIS

Item	Vaccine Treatment	
	Pyramid 5	Express 5
Live Sale, per head		
Cattle Cost, \$ ^a	675.74	673.14
Feeding Cost, \$ ^b	373.16	377.78
BRD Health Cost, \$ ^c	14.63	18.25
Proceeds, \$ ^d	1175.76	1177.92
Net, \$	112.23	108.75
Difference, \$	+3.48	

a Initial weight (\$130.00/CWT).
b (Live Final Weight – Initial Weight) (Live Weight Feed/Gain) (\$0.08/lb Ration Cost).
c (Initial UF Treatment, n * \$13.64) + (First UF Relapse, n * \$9.37) + (Initial NF Treatment, n * \$1.81) + (First NF Relapse, n * \$13.64) + (Overall Wastage, n * \$100.00) + (BRD Mortality, n * Initial Animal Cost)/1632.
d Live Final Weight (\$90.00).

TABLE 6. FINANCIAL ANALYSIS

Item	Vaccine Treatment	
	Pyramid 5	Express 5
Formula Sale, per head		
Cattle Cost, \$ ^a	675.74	673.14
Feeding Cost, \$ ^b	374.67	379.25
BRD Health Cost, \$ ^c	14.63	18.25
Proceeds, \$ ^d	1205.46	1203.10
Net, \$	140.42	132.46
Difference, \$	+7.96	

a Initial weight (\$130.00/CWT).
b (63.0% Carcass Adjusted Final Weight – Initial Weight) (Carcass Weight Feed/Gain) (\$0.08/lb Ration Cost).
c (Initial UF Treatment, n * \$13.64) + (First UF Relapse, n * \$9.37) + (Initial NF Treatment, n * \$1.81) + (First NF Relapse, n * \$13.64) + (Overall Wastage, n * \$100.00) + (BRD Mortality, n * Initial Animal Cost)/1632.
d Proceeds: \$142.86 Base Price; 60% Quality Grade Base; \$9.00 Choice – Select Spread; YG1 + \$2.00, YG2 + \$1.00, YG3 \$0.00, YG4 - \$15.00, YG5 - \$20.00 Yield Grade Premiums/Discounts.

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