KSU BEEF STOCKER FIELD DAY

September 22, 2016
KSU Beef Stocker Unit

PROCEEDINGS

Beef Stocker Field Day 2016
September 22, 2016
KSU Beef Stocker Unit

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Beef Stocker Field Day 2016
September 22, 2016
KSU Beef Stocker Unit

Welcome to the 17th annual KSU Beef Stocker Field Day. We appreciate your attendance and support of this educational event. We are fortunate to have assembled an outstanding list of presenters and topics that we believe are relevant to your bottom line.

As always, if you have any questions on the program or suggestions for future topics, please let us know. Our strength in delivering relevant information lies in working closely with you, our stakeholder.

Sincerely,

Dale A. Blasi, PhD
Extension Beef Specialist
Department of Animal Sciences and Industry
College of Agriculture

THANK YOU

We would like to express a special "THANK YOU" to Merck Animal Health for their support of today's educational program and activities for the beef stocker segment. With their financial assistance, we are able to deliver the caliber of programming that today's events have in store for you. Please take a moment to stop by their display to see the line of products that they have to offer.

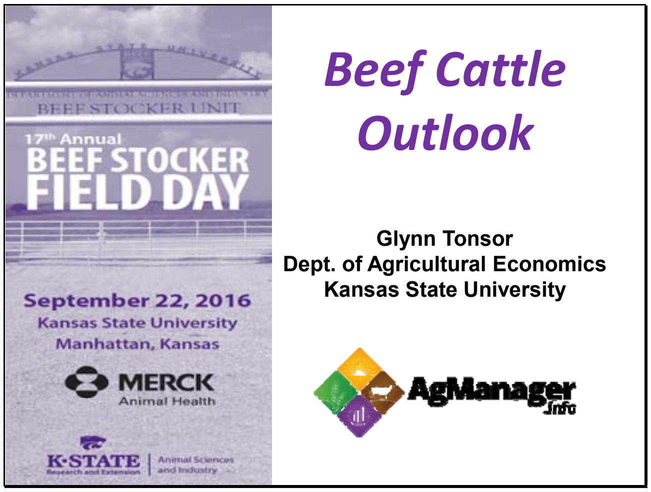
Beef Stocker Field Day 2016
September 22, 2016
KSU Beef Stocker Unit

9:30 a.m.	Registration/Coffee
10:15 a.m.	Introductions
10:30 a.m.	**Beef Cattle Outlook** *Dr. Glynn Tonsor, Kansas State University*
11:15 a.m.	**Producer Panel: Pasture Burning Issues- The necessity, alternatives and consequences** *Dr. Clenton Owensby, Kansas State University* *Mike Holder, Kansas State University, Extension Agent, Chase County* *Mike Collinge, Stocker Operator, Hamilton, KS* *Matt Teagarden, CEO, Kansas Livestock Assocation* *Moderator: Wes Ishmael, Contributing Editor, BEEF Magazine*
12:15 p.m.	Barbecue Brisket Lunch- View Posters
1:00 p.m.	**Animal Health Research Update** *Dr. Tim Parks, Technical Services Veterinarian, Merck Animal Health*
2:00 p.m.	**Receiving diets- Implications on health and performance** *Dr. Sean Montgomery, Corn Belt Livestock Services and Kansas State University Adjunct Professor*
2:45 p.m.	**Break**
3:00 p.m.	**Parasite and Fly Control Options** *Dr. Justin Talley, Oklahoma State University*
3:45 p.m.	**Technology Applications for Beef Cattle Operations** *Dr. Ray Asebedo, Kansas State University*
4:30 p.m.	**Beef Cattle Handling** *Dr. Tom Noffsinger, DVM, Benkelman, NE*
5:30 p.m.	Cutting Bull's Lament 2016

Notes – Notes -- Notes

Beef Cattle Outlook

Dr. Glynn Tonsor
Agricultural Economist
Kansas State University



"Interesting Times" in the Beef Industry

BREXIT

IMPORTS FROM BRAZIL

TPP/TTIP & US Election

In China Beef Trade, U.S. Gain May Mean Australia Pain

“Interesting Times” in the Beef Industry

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JULY JOBS: +255k (vs. 180 exp)
AUG JOBS: +151k (vs. 180 exp)

DEC CORN: -$1/bu Since mid-June

“Interesting Times” in the Beef Industry

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JULY JOBS: +255k (vs. 180 exp)
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CATTLE MARKETS “BROKEN”

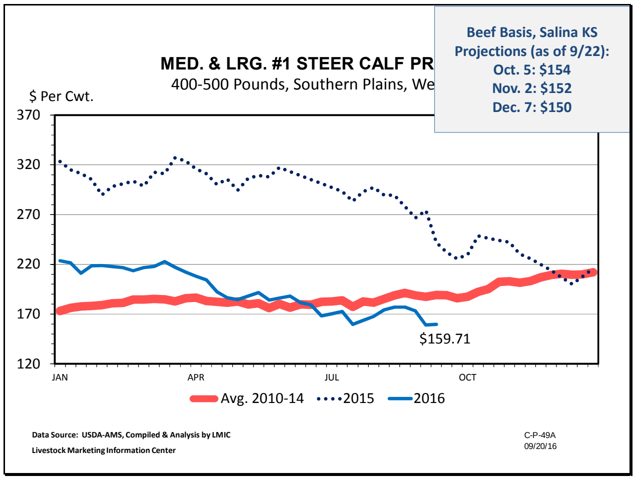
CME LC CONTRACT CHANGES

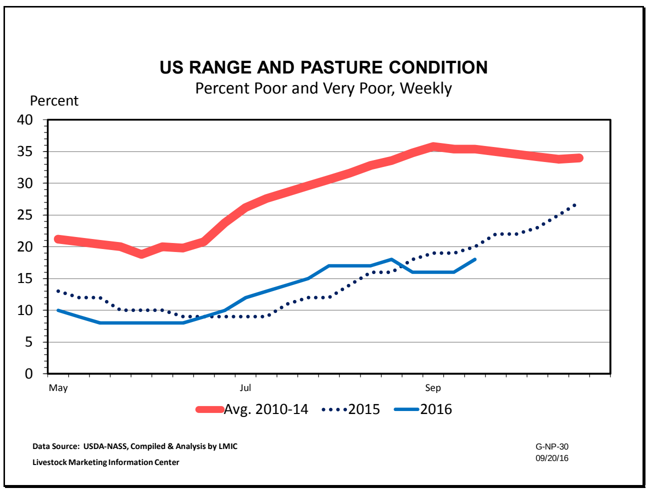
CME FC INDEX CHANGES

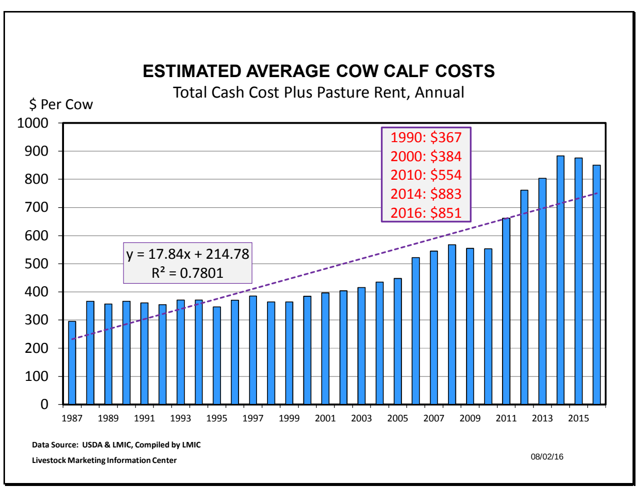
NO JULY CATTLE INVENTORY REPORT

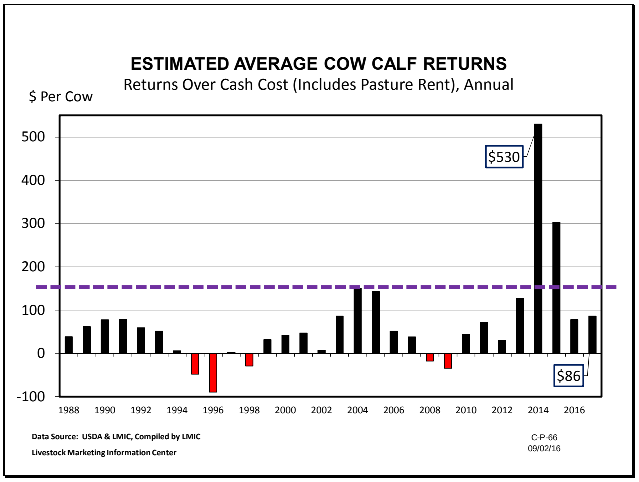
Overarching Beef Industry Economic Outlook

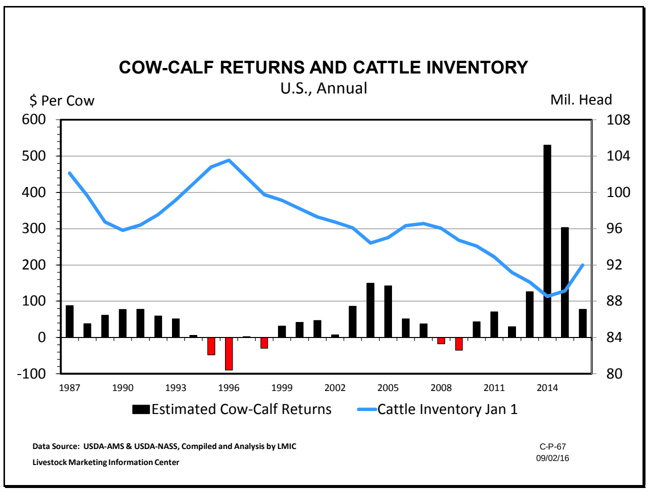
- Supplies
  - Growing across all proteins
    - Herd expansion stalled or stopped?
- Demand
  - Confusing & slowing in 2016
- Combined
  - *“opportunity or challenge” depends on perspective…*

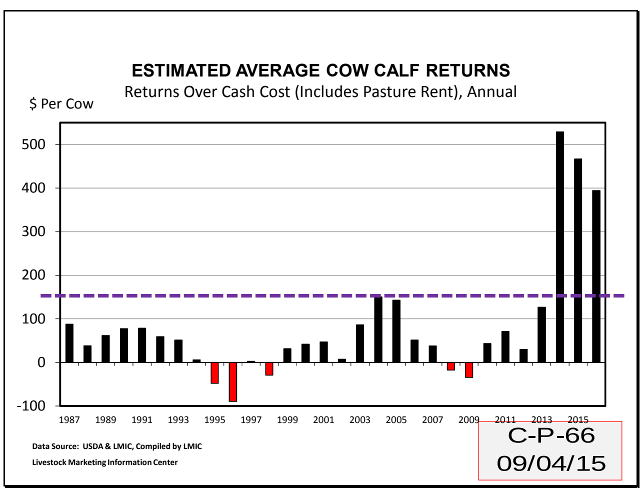

MED. & LRG. #1 STEER CALF PR
400-500 Pounds, Southern Plains, We
Beef Basis, Salina KS
Projections (as of 9/22):
Oct. 5: $154
Nov. 2: $152
Dec. 7: $150
$ Per Cwt.
370
320
270
220
170
120
JAN
APR
JUL
OCT
$159.71
Avg. 2010-14
2015
2016
Data Source: USDA-AMS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
C-P-49A
09/20/16

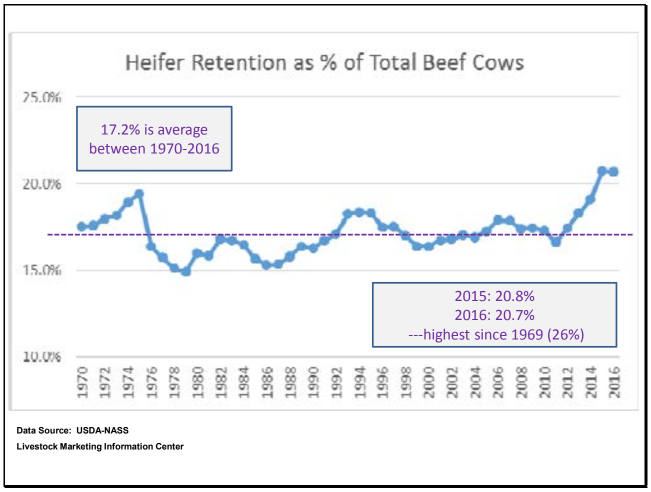

US RANGE AND PASTURE CONDITION
Percent Poor and Very Poor, Weekly
Percent
40
35
30
25
20
15
10
5
0
May
Jul
Sep
Avg. 2010-14
2015
2016
Data Source: USDA-NASS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
G-NP-30
09/20/16

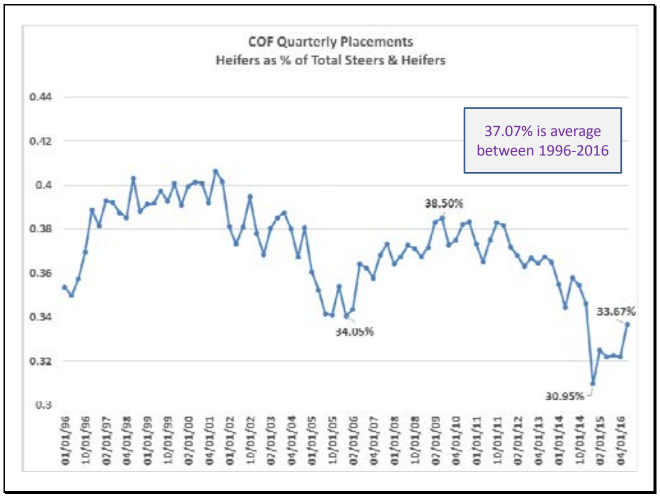

ESTIMATED AVERAGE COW CALF COSTS
Total Cash Cost Plus Pasture Rent, Annual
$ Per Cow
1000
900
800
700
600
500
400
300
200
100
0
1990: $367
2000: $384
2010: $554
2014: $883
2016: $851
y = 17.84x + 214.78
R² = 0.7801
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
Data Source: USDA & LMIC, Compiled by LMIC
Livestock Marketing Information Center
08/02/16

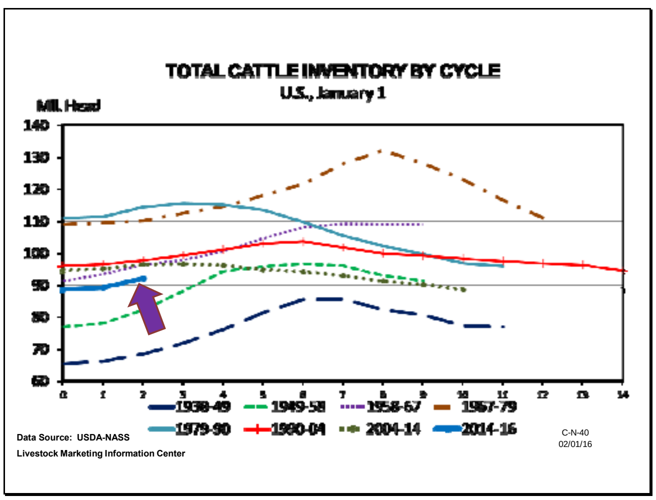

ESTIMATED AVERAGE COW CALF RETURNS
Returns Over Cash Cost (Includes Pasture Rent), Annual
$ Per Cow
$530
$86
Data Source: USDA & LMIC, Compiled by LMIC
Livestock Marketing Information Center
C-P-66
09/02/16

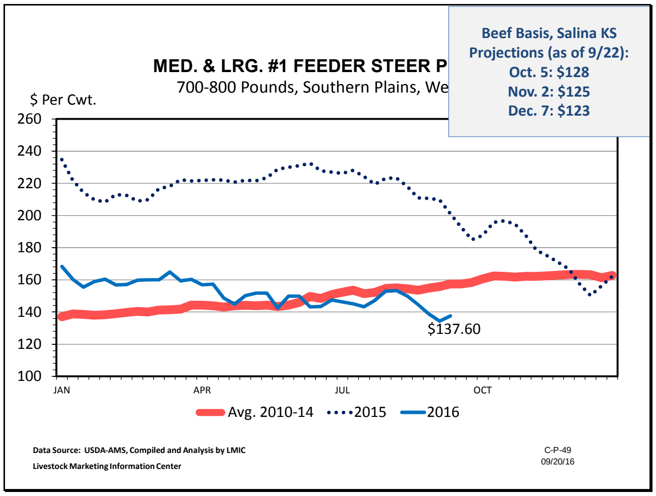

COW-CALF RETURNS AND CATTLE INVENTORY
U.S., Annual
$ Per Cow
Mil. Head
Estimated Cow-Calf Returns
Cattle Inventory Jan 1
Data Source: USDA-AMS & USDA-NASS, Compiled and Analysis by LMIC
Livestock Marketing Information Center
C-P-67
09/02/16


ESTIMATED AVERAGE COW CALF RETURNS
Returns Over Cash Cost (Includes Pasture Rent), Annual
$ Per Cow
Data Source: USDA & LMIC, Compiled by LMIC
Livestock Marketing Information Center
C-P-66
09/04/15


Heifer Retention as % of Total Beef Cows
17.2% is average between 1970-2016
2015: 20.8%
2016: 20.7%
---highest since 1969 (26%)
Data Source: USDA-NASS
Livestock Marketing Information Center


COF Quarterly Placements
Heifers as % of Total Steers & Heifers
37.07% is average between 1996-2016
38.50%
34.05%
33.67%
30.95%


TOTAL CATTLE INVENTORY BY CYCLE
U.S., January 1
Mil. Head
1938-49
1949-58
1958-67
1967-79
1979-90
1990-04
2004-14
2014-16
Data Source: USDA-NASS
Livestock Marketing Information Center
C-N-40
02/01/16

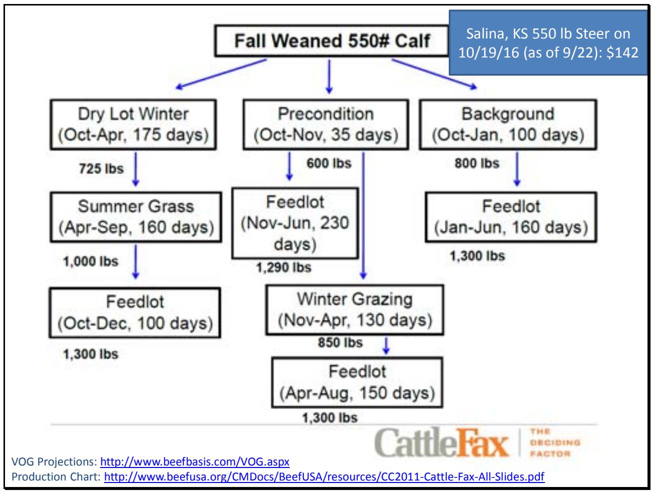


Projecting Stocker/Backgrounder VOG

- Should we use current cash market's implied VOG?
  - Dodge City, KS Sept 19th report:
    - 521 lbs @ $160.43 & 761 lbs @ $136.36
      - Implies VOG of $202/hd; $0.84/cwt

Projecting Stocker/Backgrounder VOG

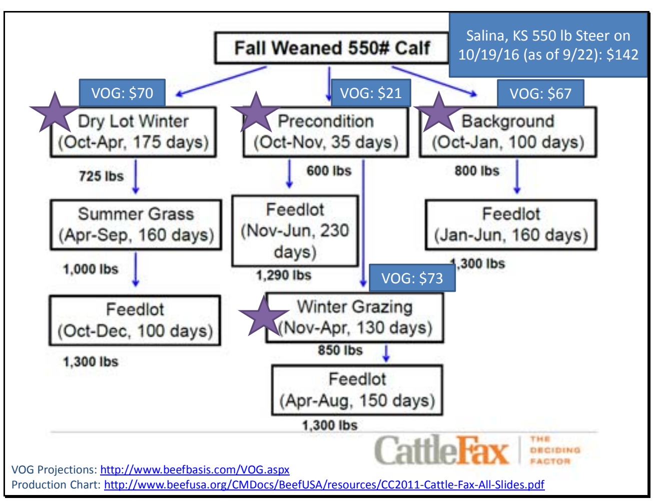
- Should we use current cash market's implied VOG?
  - Dodge City, KS Sept 19th report:
    - 521 lbs @ $160.43 & 761 lbs @ $136.36
      - Implies VOG of $202/hd; $0.84/cwt
- Current cash market implied VOG vs. forward-looking, historical basis/CME VOG forecasts
  - KS, Sept 550 lb calves – April 725 lbs / 1995-2015 placements
    - 67% of time basis-adjusted, futures implied VOG forecast is more accurate
    - Average & Range in VOG forecasting errors (actual-realized)
      - Current Cash Mkt Approach: -$15.26/hd (-$349 Apr 2016, $201 Apr 2011)
      - Hist. Basis + CME Approach: $7.86/hd (-$214 Apr 2016, $160 Apr 2011)



Economic Outlook Overview: Stockers

http://www.beefbasis.com/ForecastingTools/ValueofGain/tabid/1132/Default.aspx

- Salina, KS 9/22/16 Preconditioning, 35 DOF Case:
  - Buy 550 lb steer on 10/19/16 ($141.71)
  - Sell 600 lb steer on 11/21/16 ($131.66) {ADG 1.5}
    - VOG: $21/cwt
      - *NOTE THIS DOES NOT REFLECT ANY "PRECONDITIONED" CLAIM PREMIUM*



Economic Outlook Overview: Stockers

http://www.beefbasis.com/ForecastingTools/ValueofGain/tabid/1132/Default.aspx

- Salina, KS 9/22/16 Backgrounding, 100 DOF Case:
  - Buy 550 lb steer on 10/19/16 ($141.71)
  - Sell 800 lb steer on 01/29/17 ($118.47) {ADG 2.4}
    - VOG: $67/cwt

Economic Outlook Overview: Stockers

http://www.beefbasis.com/ForecastingTools/ValueofGain/tabid/1132/Default.aspx

- Salina, KS 9/22/16 Dry Lot Winter, 175 DOF Case:
  - Buy 550 lb steer on 10/19/16 ($141.71)
  - Sell 725 lb steer on 04/06/17 ($124.52) {ADG 1.0}
    - VOG: $70/cwt

Economic Outlook Overview: Stockers

http://www.beefbasis.com/ForecastingTools/ValueofGain/tabid/1132/Default.aspx

- Salina, KS 9/22/16 Winter Grazing, 130 DOF Case:
  - Buy 600 lb steer on 11/21/16 ($131.66)
  - Sell 850 lb steer on 03/30/17 ($114.29) {ADG 1.9}
    - VOG: $73/cwt

Economic Outlook Overview: Stockers

http://www.beefbasis.com/ForecastingTools/ValueofGain/tabid/1132/Default.aspx

- Salina, KS 9/22/16 Preconditioning + Winter Grazing, 165 DOF Case:
  - Buy 550 lb steer on 10/19/16 ($141.71)
  - Sell 850 lb steer on 03/20/17 ($114.29) {ADG 1.8}
    - VOG: $64/cwt

CME FC Index Change

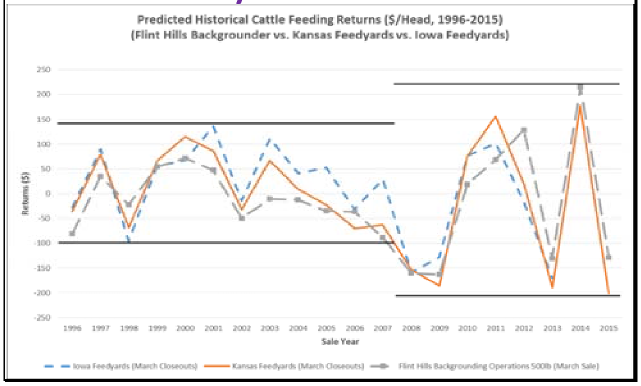
- Nov FC Contract
  - Settle against 700-899 lbs (vs 650-849 lbs) wtd avg
- *BeefBasis.com* Initial Assessment
  - New Index ~$3.18 lower (avg over 2011-2015)

Nov FC Futures	$ 130.00
"Old" 550 lb, Nov. 2nd KS Basis Expecation	$ 8.81
Implied Nov Cash Price Forecast	$ 138.81
"New" 550 lb, Nov. 2nd KS Basis Expecation	$ 11.99
Implied Nov Cash Price Forecast	$ 141.99

Stocker Research of Note: Henry Ott's MS Thesis

- 1996-2015 Flint Hills, KS assessment
  - Sept & Nov backgrounding placements (425, 500, 575 lbs) with planned March sale
  - April & May stocker placements (450, 600, 750 lbs) with planned July sale
- Full thesis available online: http://krex.k-state.edu/dspace/handle/2097/4/browse?value=Ott%2C+Henry+L.&type=author

Stocker Research of Note: Henry Ott's MS Thesis



Stocker Research of Note: Henry Ott's MS Thesis

- 20-Year AVERAGE Net Return Results Summary
  - Nov>Sept backgrounding placements
  - April>May stocker placements
  - Lighter>Heavier placements
- Full thesis available online: http://krex.k-state.edu/dspace/handle/2097/4/browse?value=Ott%2C+Henry+L.&type=author

Stocker Research of Note: Henry Ott's MS Thesis

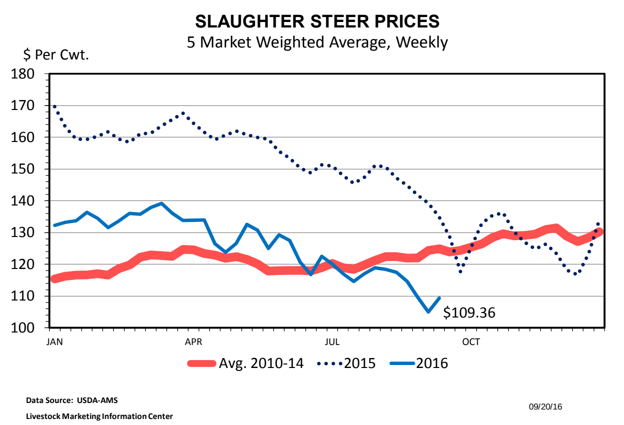
Table 4.30 Scenario Comparison

425/450lb Scenario Comparison, 1996-2015				
	Scenarios			
Criterion	Sept-March	Nov-March	April-July	May-July
Average Ex-Post Net Income ($)	23.26	38.06	78.87	49.32
Ex-Post Net Income Range ($)	(-125.96,272.41)	(-148.84,212.12)	(-48.27,397.33)	(-57.64,380.04)
Coefficient of Variation	4.304	2.024	1.161	1.893
Average Net Income Prediction Error ($)	10.77	3	-38.32	-12.94
% of Years the Market Signals Early Sale	55	30	10	10

- Full thesis available online: http://krex.k-state.edu/dspace/handle/2097/4/browse?value=Ott%2C+Henry+L.&type=author

Economic Outlook Overview: Feedlots

- 2016 Remains tough
- Structural concerns persist:
  - Excess capacity & Slowed/Stalled Herd Growth



Historical and Projected Kansas Feedlot Net Returns
(as of 9/9/16')
(http://www.agmanager.info/livestock-meat/cattle-finishing-historical-and-projected-returns)

July 16': -$104/steer

Table 1. Projected Values for Finishing Steers in Kansas Feedyards*

Closeout Mo-Yr	Net Return	FCOG**	Fed Price	Feeder Price	Breakeven FCOG**	Breakeven Fed Price	Breakeven Feeder Price
Aug-16	-97.79	77.63	116.50	151.60	61.14	123.23	140.23
Sep-16	-237.89	76.50	105.24	148.36	36.11	121.40	121.42
Oct-16	-185.98	77.14	105.26	145.14	47.93	117.77	123.26
Nov-16	-169.79	78.50	105.86	142.83	51.37	117.32	122.99
Dec-16	-164.98	79.32	106.07	140.14	51.46	117.29	121.35
Jan-17	-176.21	80.21	107.68	144.52	50.92	119.75	124.00
Feb-17	-88.04	79.40	105.60	132.50	65.01	111.68	121.97
Mar-17	-14.30	79.10	107.22	125.07	76.63	108.21	123.43
Apr-17	-92.03	78.64	100.38	124.29	62.77	106.95	113.11
May-17	-16.33	77.81	104.83	123.09	74.99	105.99	121.12

Representative Barometer for Trends in Profitability

Historical and Projected Kansas Feedlot Net Returns
(as of 9/9/16')
(http://www.agmanager.info/livestock-meat/cattle-finishing-historical-and-projected-returns)

July 16': -$104/steer

Table 1. Projected Values for Finishing Steers in Kansas Feedyards*

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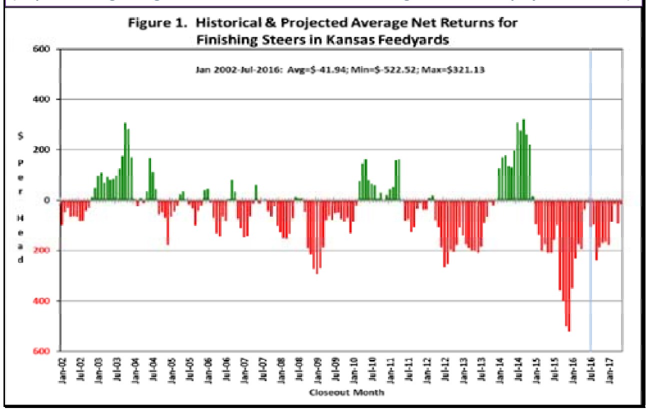
Aug-16	-97.79	77.63	116.50	151.60	61.14	123.23	140.23
Sep-16	-237.89	76.50	105.24	148.36	36.11	121.40	121.42
Oct-16	-185.98	LC Up ~$4 since 9/9	105.26	145.14	47.93	117.77	123.26
Nov-16	-169.79		105.86	142.83	51.37	117.32	122.99
Dec-16	-164.98		106.07	140.14	51.46	117.29	121.35
Jan-17	-176.21		107.68	144.52	50.92	119.75	124.00
Feb-17	-88.04		105.60	132.50	65.01	111.68	121.97
Mar-17	-14.30		107.22	125.07	76.63	108.21	123.43
Apr-17	-92.03		100.38	124.29	62.77	106.95	113.11
May-17	-16.33		104.83	123.09	74.99	105.99	121.12

Representative Barometer for Trends in Profitability

Historical and Projected Kansas Feedlot Net Returns (as of 9/9/16')
(http://www.agmanager.info/livestock-meat/cattle-finishing-historical-and-projected-returns)



Economic Outlook Overview: Feedlots

- 9/23 COF Report Expectations
  - On-Feed Sept 1: +1.2% (+0.3%, +1.9%)
  - Placed in Aug: +13.1% (+8.6%, +18.0%)
  - Marketed in Aug: +17.5% (+12.3%, +18.1%)
- FI Slaughter vs. 2015 (thru 9/3)

Total Cattle	Steers	Heifers	Total Steers & Heifers	Cows Dairy	Cows Other	Total Cows	Bulls	Total Cows & Bulls
2016 TO DATE (1,000 HD)								
20,010	11,083	5,019	16,102	1,933	1,644	3,578	330	3,908
2015 thru Sept. 3 (1,000 HD)								
19,048	10,324	4,986	15,309	1,956	1,472	3,428	310	3,739
2016 vs 2015								
105%	107%	101%	105%	99%	112%	104%	106%	105%

Quarterly Forecasts (LMIC: 9/1/16)

Year Quarter	Comm'l Slaughter	% Chg. from Year Ago	Average Dressed Weight	% Chg. from Year Ago	Comm'l Beef Production	% Chg. from Year Ago
2016						
I	7,181	3.0	826.5	1.7	5,935	4.8
II	7,629	5.5	810.9	0.1	6,187	5.6
III	7,788	6.8	825.1	-0.9	6,426	5.9
IV	7,469	2.8	833.6	-0.9	6,226	1.9
Year	30,066	4.6	823.9	0.0	24,773	4.5
2017						
I	7,530	4.9	829.2	0.3	6,244	5.2
II	7,997	4.8	814.8	0.5	6,516	5.3
III	7,987	2.6	827.8	0.3	6,612	2.9
IV	7,770	4.0	835.4	0.2	6,491	4.3
Year	31,284	4.0	826.7	0.3	25,863	4.4
2018						
I	7,762	3.1	833.2	0.5	6,467	3.6
II	8,186	2.4	818.7	0.5	6,702	2.9
III	8,169	2.3	831.6	0.4	6,793	2.7
IV	8,062	3.8	839.0	0.4	6,764	4.2
Year	32,179	2.9	830.5	0.5	26,726	3.3

Quarterly Forecasts (LMIC: 9/1/16)

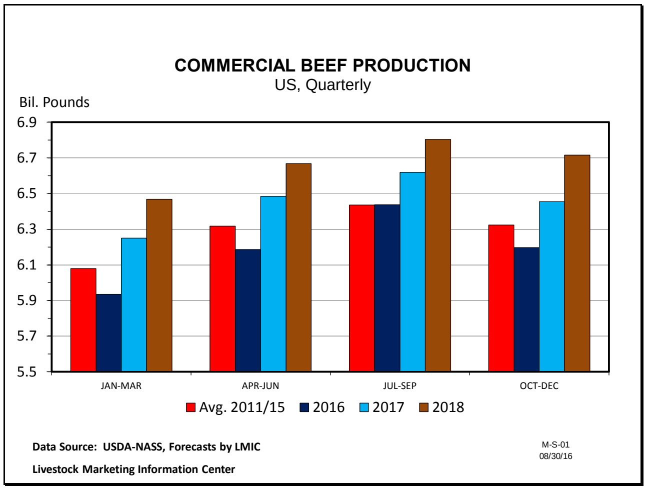
Year Quarter	Live Sltr. Steer Price 5-Mkt Avg	% Chg. from Year Ago	Feeder Steer Price Southern Plains 7-800#	5-600#
2016				
I	135	-17.0	160	196
II	128	-19.2	149	174
III	117-118	-18.5	147-149	161-164
IV	120-122	-5.3	146-150	160-165
Year	124-126	-15.6	150-153	171-176
2017				
I	121-124	-9.1	144-149	163-169
II	120-124	-4.5	145-152	166-173
III	115-120	0.0	142-150	162-170
IV	116-122	-1.7	141-149	157-166
Year	118-122	-4.0	144-149	163-169
2018				
I	115-122	-3.3	139-148	159-169
II	115-123	-2.5	140-150	161-172
III	110-119	-2.6	136-147	157-170
IV	111-121	-2.5	135-147	154-168
Year	114-120	-2.5	140-146	160-168

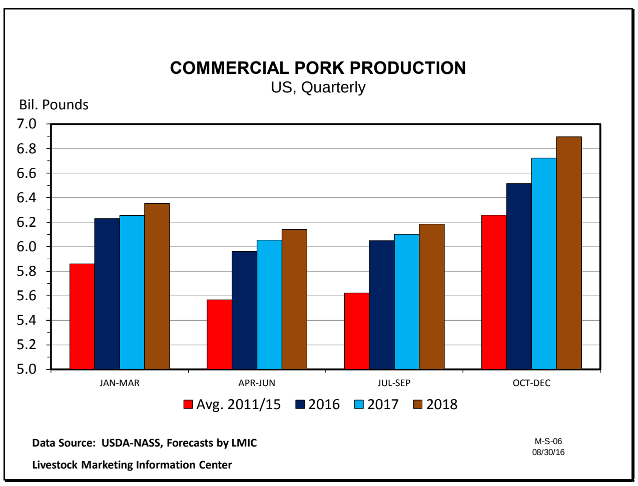
Quarterly Forecasts (LMIC: 9/1/16)

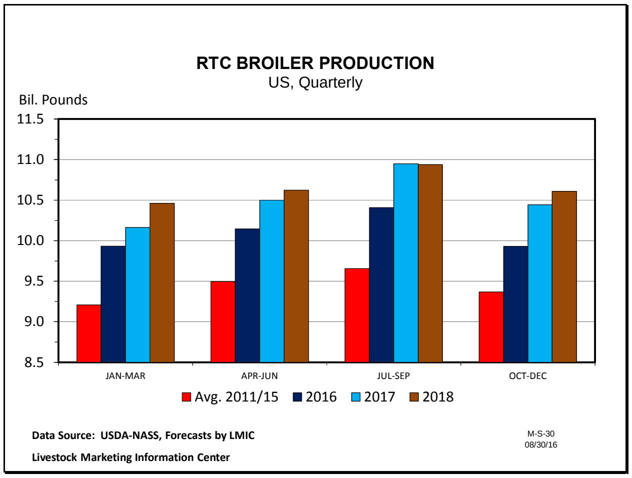
Year Quarter	Live Sltr. Steer Price 5-Mkt Avg	% Chg. from Year Ago	Feeder Steer Price Southern Plains 7-800#	5-600#
2016				
I	135	-17.0	160	196
II	128	-19.2	149	174
III	117-118		147-149	161-164
IV	120-122		146-150	160-165
Year	124-126		150-153	171-176
2017				
I	121-124		144-149	163-169
II	120-124		145-152	166-173
III	115-120		142-150	162-170
IV	116-122		141-149	157-166
Year	118-122		144-149	163-169
2018				
I	115-122	-3.3	139-148	159-169
II	115-123	-2.5	140-150	161-172
III	110-119	-2.6	136-147	157-170
IV	111-121	-2.5	135-147	154-168
Year	114-120	-2.5	140-146	160-168

since 9/1
LC +$3 to $4
FC -$1 to $2

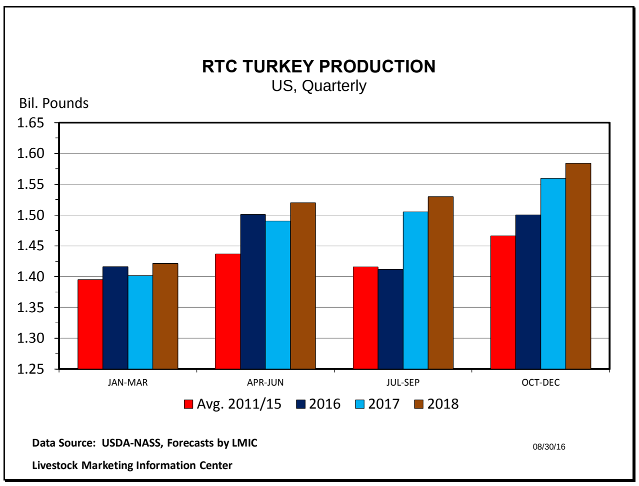
Trade & Meat Supplies



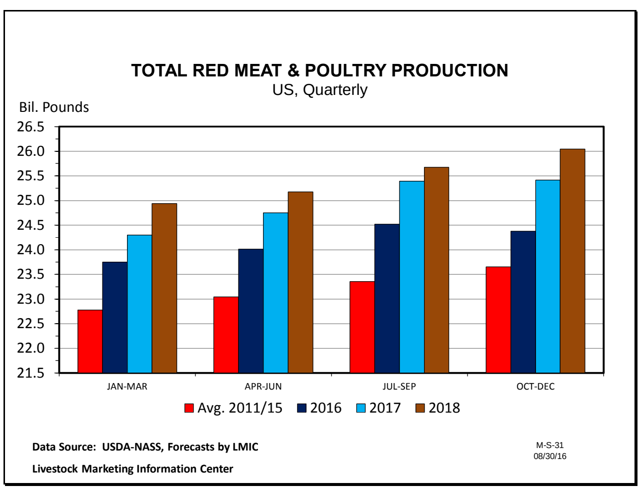




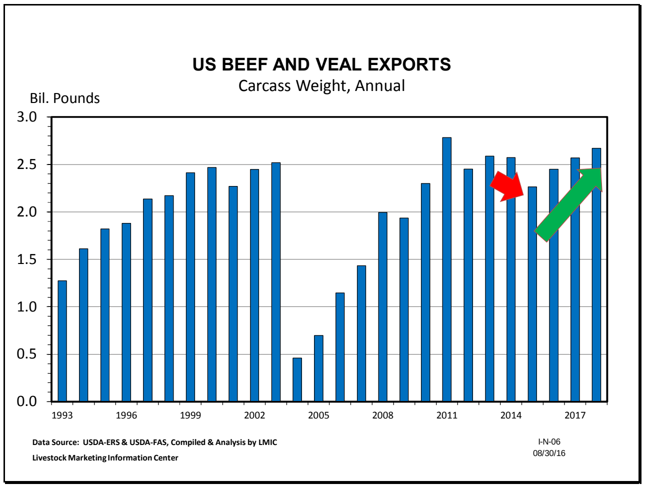
RTC BROILER PRODUCTION
US, Quarterly
Bil. Pounds
11.5
11.0
10.5
10.0
9.5
9.0
8.5
JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC
Avg. 2011/15
2016
2017
2018
Data Source: USDA-NASS, Forecasts by LMIC
Livestock Marketing Information Center
M-S-30
08/30/16



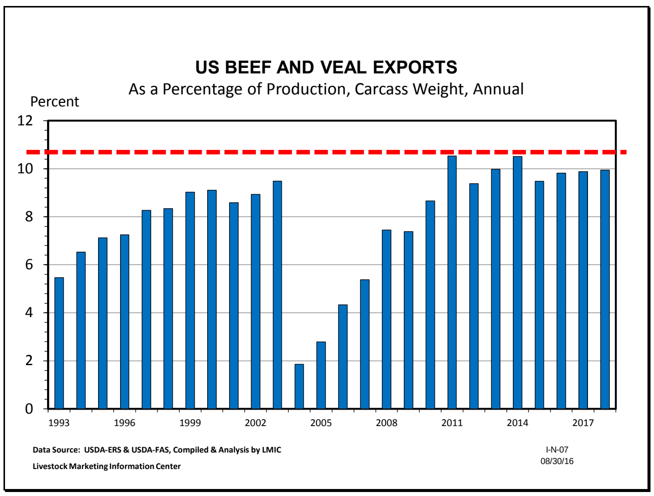
RTC TURKEY PRODUCTION
US, Quarterly
Bil. Pounds
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC
Avg. 2011/15
2016
2017
2018
Data Source: USDA-NASS, Forecasts by LMIC
Livestock Marketing Information Center
08/30/16



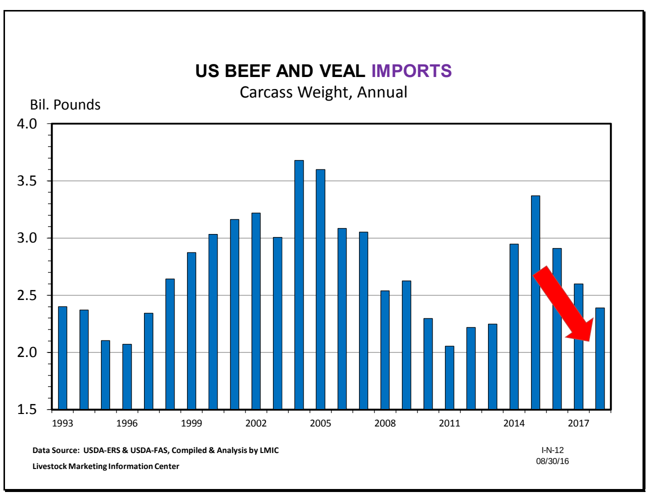
TOTAL RED MEAT & POULTRY PRODUCTION
US, Quarterly
Bil. Pounds
26.5
26.0
25.5
25.0
24.5
24.0
23.5
23.0
22.5
22.0
21.5
JAN-MAR
APR-JUN
JUL-SEP
OCT-DEC
Avg. 2011/15
2016
2017
2018
Data Source: USDA-NASS, Forecasts by LMIC
Livestock Marketing Information Center
M-S-31
08/30/16



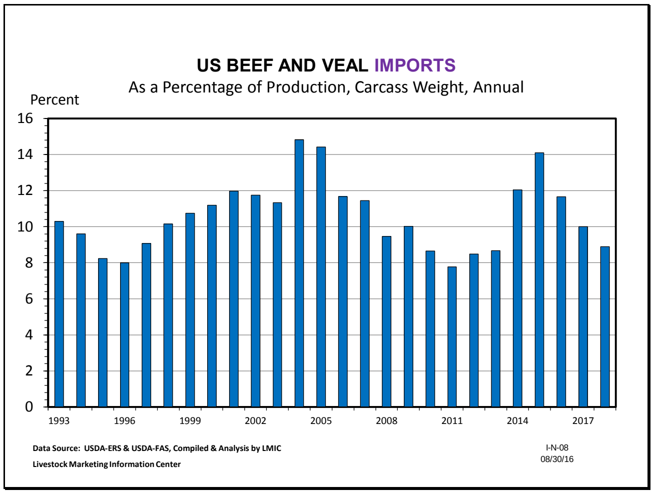
US BEEF AND VEAL EXPORTS
Carcass Weight, Annual
Bil. Pounds
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1993
1996
1999
2002
2005
2008
2011
2014
2017
Data Source: USDA-ERS & USDA-FAS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
I-N-06
08/30/16

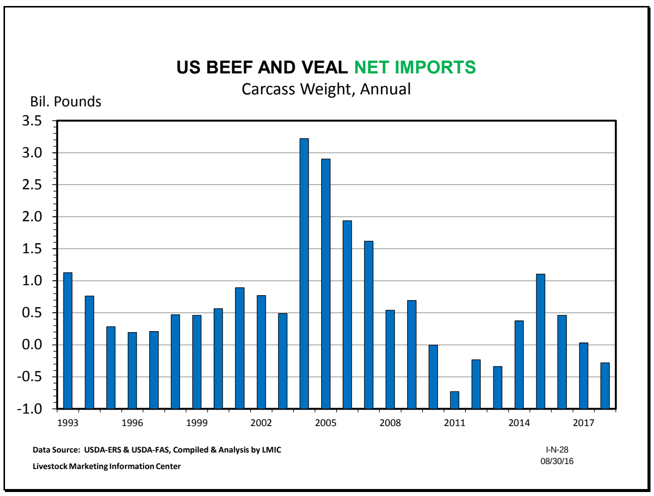


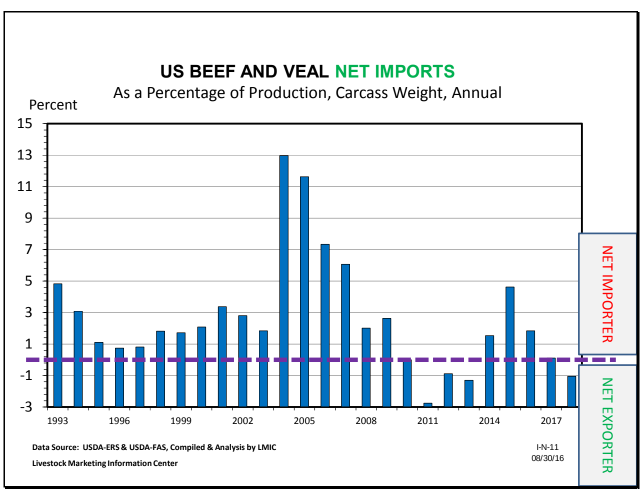
US BEEF AND VEAL EXPORTS
As a Percentage of Production, Carcass Weight, Annual
Percent
12
10
8
6
4
2
0
1993
1996
1999
2002
2005
2008
2011
2014
2017
Data Source: USDA-ERS & USDA-FAS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
I-N-07
08/30/16

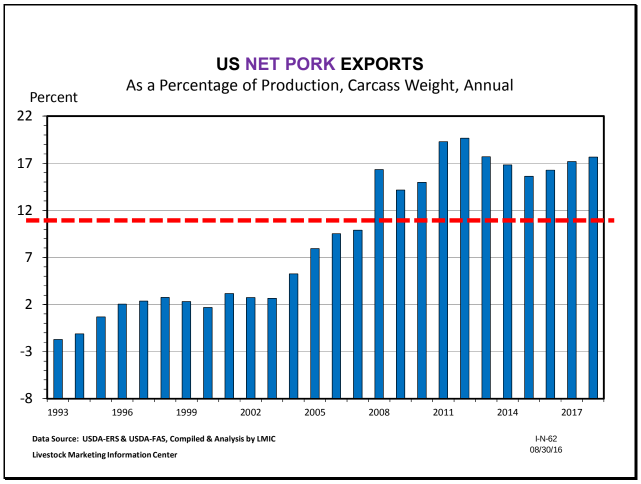


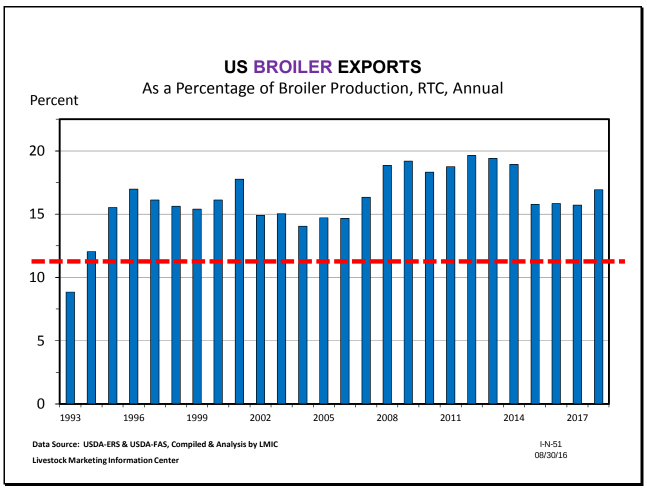
US BEEF AND VEAL IMPORTS
Carcass Weight, Annual
Bil. Pounds
4.0
3.5
3.0
2.5
2.0
1.5
1993
1996
1999
2002
2005
2008
2011
2014
2017
Data Source: USDA-ERS & USDA-FAS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
I-N-12
08/30/16


US BEEF AND VEAL IMPORTS
As a Percentage of Production, Carcass Weight, Annual
Percent
16
14
12
10
8
6
4
2
0
1993
1996
1999
2002
2005
2008
2011
2014
2017
Data Source: USDA-ERS & USDA-FAS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
I-N-08
08/30/16


US BEEF AND VEAL NET IMPORTS
Carcass Weight, Annual
Bil. Pounds
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
1993
1996
1999
2002
2005
2008
2011
2014
2017
Data Source: USDA-ERS & USDA-FAS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
I-N-28
08/30/16


US BEEF AND VEAL NET IMPORTS
As a Percentage of Production, Carcass Weight, Annual
Percent
15
13
11
9
7
5
3
1
-1
-3
1993
1996
1999
2002
2005
2008
2011
2014
2017
NET IMPORTER
NET EXPORTER
Data Source: USDA-ERS & USDA-FAS, Compiled & Analysis by LMIC
Livestock Marketing Information Center
I-N-11
08/30/16





USDA Long-Term projections

Nov. 2015 pre-report release (http://www.usda.gov/oce/commodity/projections/index.htm)

Per capita meat cons., retail wt	Recent		Next 5 Years					10 Years Out
Item	2014	2015	2016	2017	2018	2019	2020	2025
					Pounds			
Beef	54.1	54.4	55.3	55.2	55.6	56.1	56.3	56.8
Pork	46.4	49.5	49.7	50.1	50.5	50.8	50.9	51.1
Total red meat	101.7	105.2	106.1	106.5	107.2	108.0	108.3	108.9
Broilers	83.3	89.1	89.6	89.5	89.8	90.2	90.7	91.5
Turkeys	15.7	15.8	16.2	16.7	17.0	17.1	17.2	17.3
Total poultry	100.3	106.1	107.1	107.5	108.1	108.7	109.3	110.3
Red meat & poultry	202.1	211.2	213.2	214.0	215.3	216.7	217.6	219.2

	PC Red Meat & Poultry
1995	207.5
2000	216.2
2005	221.2
2010	208.9
2014	201.9

lowest since 1990

53

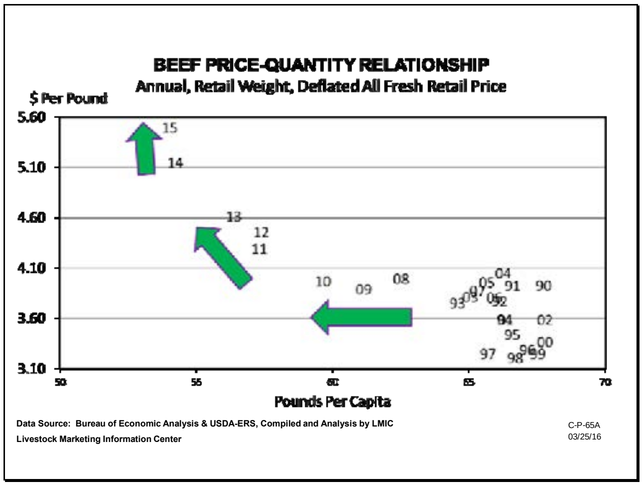
USDA Long-Term projections

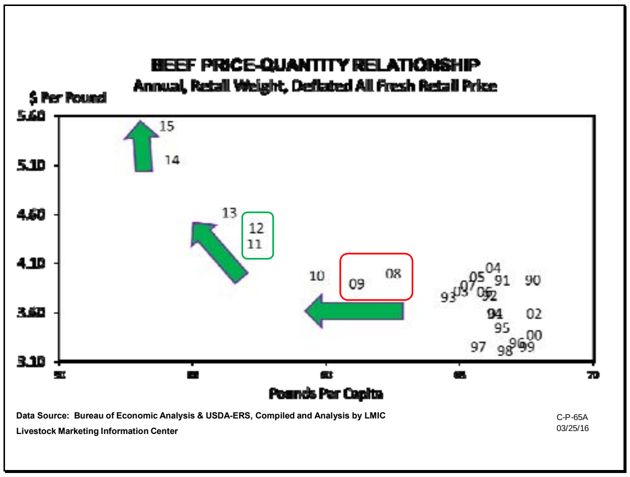
Nov. 2015 pre-report release (http://www.usda.gov/oce/commodity/projections/index.htm)

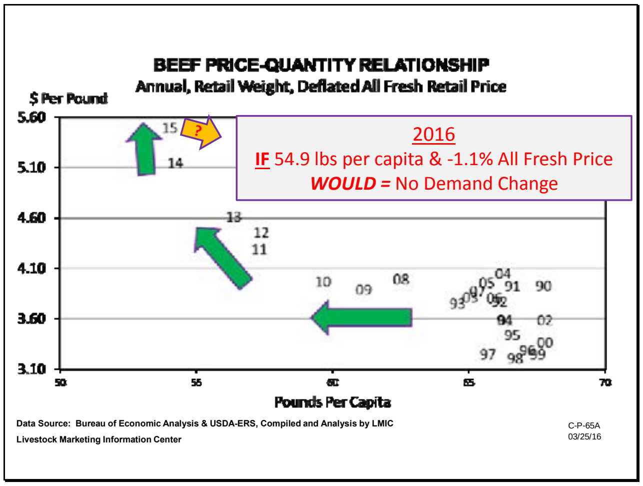
Per capita meat cons., retail wt	Recent		Next 5 Years					10 Years Out
Item	2014	2015	2016	2017	2018	2019	2020	2025
					Pounds			
Beef	54.1	54.4	55.3	55.2	55.6	56.1	56.3	56.8
Pork	46.4	49.5	49.7	50.1	50.5	50.8	50.9	51.1
Total red meat	101.7	105.2	106.1	106.5	107.2	108.0	108.3	108.9
Broilers	83.3	89.1	89.6	89.5	89.8	90.2	90.7	91.5
Turkeys	15.7	15.8	16.2	16.7	17.0	17.1	17.2	17.3
Total poultry	100.3	106.1	107.1	107.5	108.1	108.7	109.3	110.3
Red meat & poultry	202.1	211.2	213.2	214.0	215.3	216.7	217.6	219.2

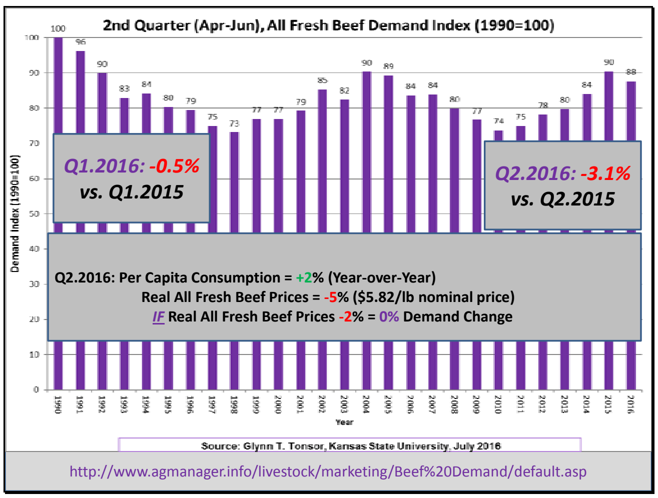
Projections INCLUDE growing export forecasts…

54









Relative Changes in Beef & Cattle Prices

	All Fresh Retail Beef	KS 550 LB CALF	KS DIRECT SLAUGHTER
Values ($/lb or $/cwt)			
2008	396.7	116.7	92.9
2009	389.3	110.0	83.4
2010	402.1	123.8	95.4
2011	444.0	149.7	114.4
2012	469.4	170.0	122.7
2013	493.8	169.7	125.6
2014	560.0	244.8	154.2
2015	603.8	252.1	148.3
2016	579.0	179.3	127.8
Yr-O-Yr Change (%)			
2009	-1.9%	-5.7%	-10.2%
2010	3.3%	12.5%	14.3%
2011	10.4%	20.9%	19.9%
2012	5.7%	13.5%	7.3%
2013	5.2%	-0.2%	2.3%
2014	13.4%	44.3%	22.8%
2015	7.8%	3.0%	-3.8%
2016	-4.1%	-28.9%	-13.8%

Wrap-Up

- Broad 2016-2017 Profitability Outlook
  - Cow-calf: Converging toward Long-Term Levels
  - Stocker: Opportunity varies widely across situations
  - Feedlot: Ongoing struggle; worst behind us (I think)

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More information available at:

AgManager.info

This presentation will be available in PDF format at:
http://www.agmanager.info/contributors/tonsor

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Twitter: @TonsorGlynn

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AgManager.info

Notes – Notes -- Notes

Animal Health Research Update

Dr. Tim Parks
Technical Services Veterinarian
Merck Animal Heath

KSU STOCKER DAY 2016: MERCK ANIMAL HEALTH RESEARCH UPDATE

Tim Parks DVM
Ruminant Technical Service Veterinarian
Holton, KS
timothy.parks@merck.com

Merck Animal Health 2016

- Known as Merck in the United States and Canada
- Known as MSD everywhere else
- Merck is celebrating it's 125th birthday this year
- Corporate headquarters in New Jersey
- Merck Animal Health Ruminant, Swine, and Poultry business headquarters in DeSoto, KS
- MAH ruminant business is proud to be a Kansas business

MERCK
Animal Health

The Science of Healthier Animals.™

- Not just a tagline… The true philosophy of Merck Animal Health demonstrated from top leadership down
- Merck Animal Health strives to provide solutions to the most current animal health issues

MERCK
Animal Health

The Science of Healthier Animals.™

"Your Livelihood, Our Responsibility"

Merck Animal Health- Beyond the Products

Creating Connections

Working together for cattle well-being.

DAIRY CARE365

PrimeVAC

BY MERCK ANIMAL HEALTH

Research Updates

- KSU stocker unit trial
- FERCT Database
- Mississippi Deworming trial
- MDR surveillance

MERCK Animal Health

KSU Stocker Unit Trial

- Objective: Compare morbidity and mortality between parenteral PM/MH vaccine (Vista Once) and Vista 5 SQ / Once PMH IN
- Study animal: High risk Southeast origin heifers
- All calves were weighed, tagged, and PI tested. Calves were randomized into 2 groups, Vista 5 SQ/ Once PMH IN OR Vista Once SQ
- All calves received Safeguard PO, Vision 7 Somnus, Ivomec F injectable, Excede SQ. All calves were revaccinated with Vision 7 Somnus and Vista 5 at 14 days

MERCK Animal Health

	IN	SQ	SEM	*P*-value
Initial Wt., lb	498	499	1.3	0.77
Final Wt., lb	593	593	3.9	0.96
DMI, lb	11.9	12.0	0.13	0.50
ADG, lb	2.06	2.05	0.083	0.83
G:F	0.174	0.171	0.0069	0.66
1st Pulls	4.1%	3.6%	0.17	0.73
2nd Pulls	0.01%	0.01%	0.008	0.55
Mortality	0.004%	0.004%	0.0064	1.00

FERCT Database

- Administered by Merck and University of Nevada-Reno
- Utilizes Fecal Egg Count Reduction Test (FECRT)
  - Pre- and post-treatment manure samples
  - Tested with Modified Wisconsin Fecal Flotation Technique
- Through December 2015:
  - 538 qualified entries
  - 11,551 pre-treatment samples
  - 11,442 post-treatment samples

Safe-Guard Database

- Recommended protocol:
  - At least 20 individual samples pre-and post-treatment
    - If fewer than 18 samples, "non-qualified" in database
  - Re-sampling 14 days after treatment
    - If not 14 days, "non-qualified" in database
  - Ideal age is six months to two years of age
- 43 different products/combinations tested
  - 19 non-Safe-Guard/Panacur (n = 275 entries)
  - 4 Panacur and combinations (n = 51 entries)
  - 20 Safe-Guard and combinations (n = 206 entries)

Safe-Guard Database

- DECTOMAX
- Eprinex
- Ivomec Plus
- Ivomec Pour-On
- LONGRANGE (eprinomectin)
- CYDECTIN
- Generic Ivermectins

vs. safe-guard (fenbendazole)

Internal Parasites Are Not Your Friend

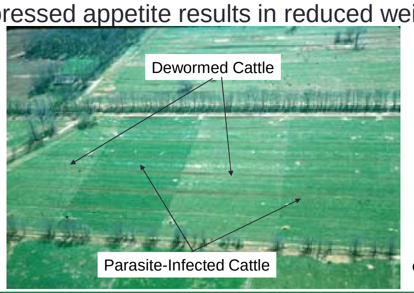
- Reduced Feed Intake
  - Largest single effect of parasites on production
- Parasites are excellent immune regulators – they inhibit the animal from responding well to vaccines

- Smith et. al., 2000 and Taylor, et. al., 2000

MERCK Animal Health

Internal Parasites Attack Growth

- Suppressed appetite results in reduced weight gain



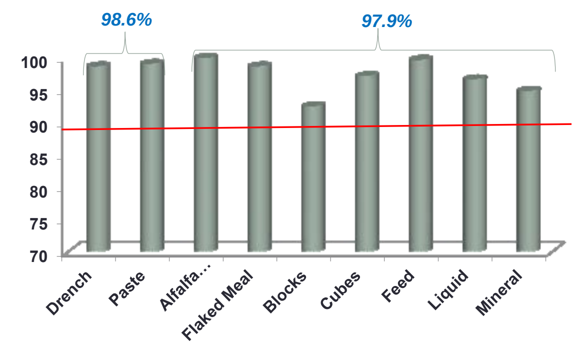
Gasbarre USDA

Summary Results

Type	Database Entries, n	Pre-Trt Average EPG[1]	Post-Trt Average EPG[1]	EPG Reduction, %	Pre-Trt Infected, %	Post-Trt Infected, %
Pour-On	151	21.2	8.7	58.5	90.1	64.2
Injectable	118	23.9	9.1	63.8	94.2	66.9
Pour-On + Injectable	6	23.8	4.5	84.6	93.3	59.2
Safe-Guard[2]	153	17.1	0.3	98.3	86.9	8.0

[1]Eggs per gram
[2]All Safe-Guard formulations. Does not include Panacur.

Safe-Guard Formulations Overall Efficacy



Entries = 78 2 5 17 4 4 25
10 8

Safe-Guard Database and FECRT

- Clearly shows advantage of Safe-Guard compared with pour-ons and injectables
- Shows that non-handling forms are as effective as drench
  - Overall efficacy greater than 98%

Comparison of LongRange®(eprinomectin) vs Safe-Guard®(fenbendazole) Strategic Parasite control program for Full Season Grazing in Stocker Calves

Objective

- Evaluate the performance and weight gain of
- two different treatment protocols for season long internal parasite control in calves on pasture.

Study Cattle

- Two groups of steers weighing approximately 615 lbs
- English-continental crossbred, with limited *Bos indicus* influence, originated from multiple Southeastern US auction markets
- Cattle were purchased between December, 2013 through February, 2014, average purchase weight
- 500-550 pounds,
- Conditioned for approximately 60 days
- Standard Processing on arrival

Treatment Groups

Treatment	Treatment name	Treatment	Day	Dose
1	LongRange	LongRange	zero	1cc/110 lbs SQ
2	Safe-Guard	Safe-Guard drench	zero	2.3mL/100lbs
		Generic Ivermectin Pour On	zero	1mL/22lbs
		Safe-Guard Range Cubes	28 and 56	2 lbs/1000lbs

LongRange is a registered trademark of Merial LLC;
Safe-Guard is a registered trademark of Intervet International, BV

Treatment Groups

- In addition all cattle in both treatment groups received Double Barrel® VP Ear tags (2/calf)
- Implanted
- Cattle were then grazed for between 120-140 days
- Fecal Egg Counts were collected at day 0,14,28,42, and every 2 weeks thereafter until completion of the study.
- Polymerase Chain Reaction (PCR) analysis was conducted on eggs at each sampling

MERCK Animal Health

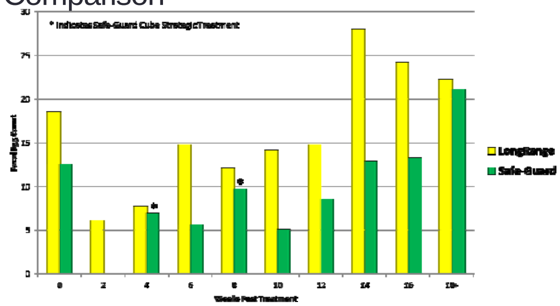
Stocking Rate

Pasture Group	Anthelmintic Treatment	Acres	# Head	Stocking Rate (ac/hd)
Kennedy North	LongRange	400	235	1.70
Kennedy South	Safe-Guard + Ivermectin Strategic Protocol	400	242	1.65

Trial Summary Specifics

Pasture Group	Anthelmintic Treatment	Head Count	Start Weight	End Weight	Gain	Grazing Period	Grazing Days	ADG
Kennedy North	LongRange	235	626	796	170	May/6/2014 - Sept/15/2014	132	1.29
Kennedy South	Safe-Guard + Ivermectin Strategic Treatment Protocol	242	624	817	193	May/7/2014 - Sept/8/2014	124	1.56

Mean Fecal Egg Count LongRange and Safe-Guard Strategic Protocol Group Comparison



[1] Mean EPG differ ($p<0.05$ by Kruskal-Wallis test) between LongRange and Safe-Guard Groups at Week 2, 6, 10, 12, and 14.

Economics

- Safe-Guard treated cattle group additional return
- 23 lbs @ *$2.30/lb= $52.90/head
- $52.90 x 242 head = $12,801.80 additional sales value
- Treatment Cost per Head
- LongRange treatment $ 6.73/ head
- Safe-Guard regimen (3 treatments total) $ 5.40/head
- $ 1.33/ head less
- Safe-Guard treatment group returned $12,801.80 more
- with $321.86 lower treatment costs ($1.33 x 242 head = $321.86)

*$2.30 = average price 7-8wt steers Sept 1-15, 2014 (OKC)

Antibiotic Resistance Discussions

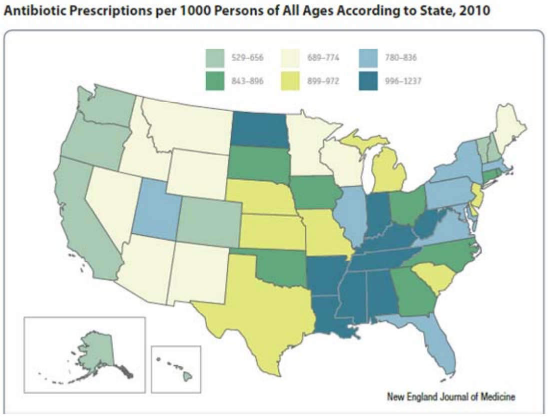
- WHY THE FUSS?
- Increased use of metaphylaxis (mass medication)
- Increased reports of antibiotics not working as well as before
- Increased findings of multi-drug resistance in cattle with no known history of prior treatment

Use of Metaphylaxis (Mass Medication)

- NAHMS – 2000 report – 10.4% of all cattle entering feedlots received antibiotics. By 2013 report, nearly 1/3 of all cattle entering feedlots received antibiotics
- Since 2005 – Five antibiotics have received control claims that allow for use at arrival in high risk calves – Draxxin (Zoetis), Zactran (Merial), Zuprevo (Merck), Baytril 100 (Bayer), Advocin (Zoetis)

NAHMS (2000) Part III – Health Management and Security in U.S. Feedlots, 1999
NAHMS (2013) Part II – Management Practices on U.S. Feedlots with a Capacity of fewer than 1000 head, 2011
Compendium of Veterinary Products, 2014

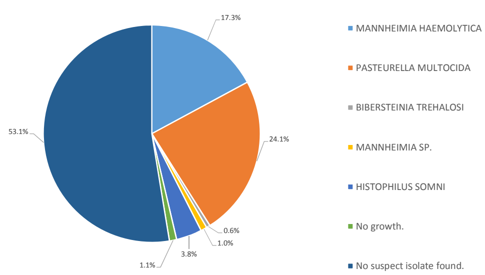
Antibiotic Prescriptions per 1000 Persons of All Ages According to State, 2010



Microbial Surveillance Lab Data Summaries

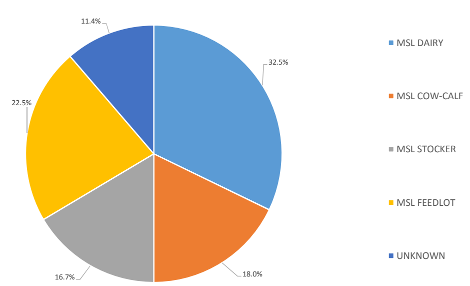
15 July 2016

Pathogen Isolation
(n=3985 submissions)

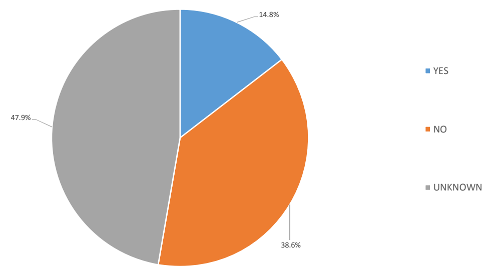


Multiple pathogen combinations isolated in 6.1% of cases

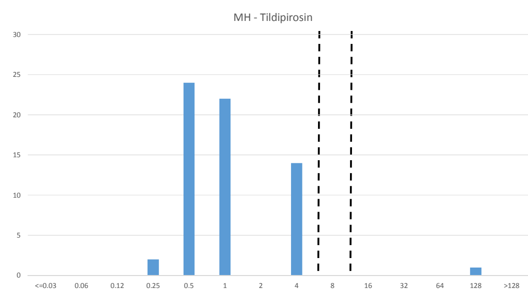
Samples by Industry Type
(n=3985 submissions)



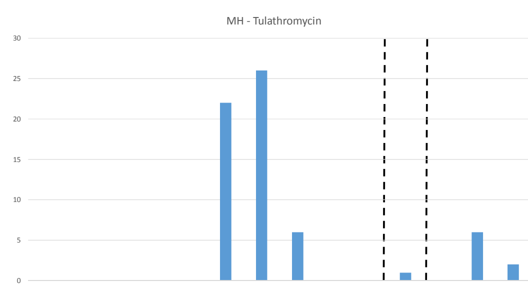
Antimicrobial exposure
(n=3279 submissions)



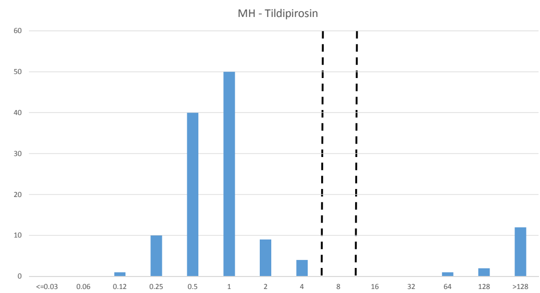
Cow-Calf
Mannheimia haemolytica n=63 isolates



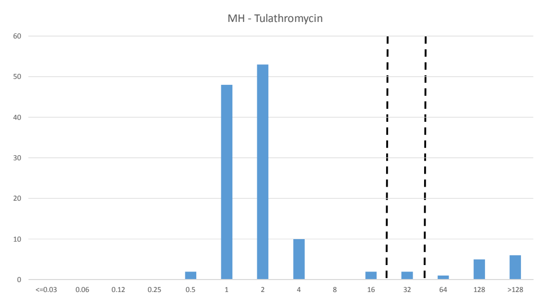
Cow-Calf
Mannheimia haemolytica n=63 isolates



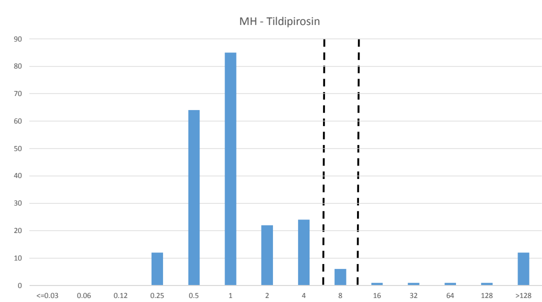
Stocker
Mannheimia haemolytica n= 129 isolates



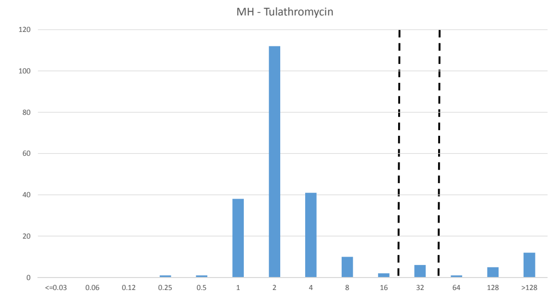
Stocker
Mannheimia haemolytica n= 122 isolates



Feedlot
Mannheimia haemolytica n=229 isolates



Feedlot
Mannheimia haemolytica n=229 isolates



Sample Results

On Arrival

	MANNHEIMIA HAEMOLYTICA		
	Interpretation	MIC	Test Range
CEFTIOFUR	S	<=0.0300	0.03-32
ENROFLOXACIN	S	<=0.0300	0.03-8
FLORFENICOL	S	0.5000	0.03-64
OXYTETRACYCLINE	S	0.2500	0.12-32
SPECTINOMYCIN	S	16.0000	4-512
TILDIPIROSIN	S	0.5000	0.03-128
TILMICOSIN	S	4.0000	0.12-128
TULATHROMYCIN	S	1.0000	0.03-128

10 days post arrival

	MANNHEIMIA HAEMOLYTICA		
	Interpretation	MIC	Test Range
CEFTIOFUR	S	0.1200	0.03-32
ENROFLOXACIN	R	8.0000	0.03-8
FLORFENICOL	R	64.0000	0.03-64
OXYTETRACYCLINE	R	>32.0000	0.12-32
SPECTINOMYCIN	S	32.0000	4-512
TILDIPIROSIN	R	>128.0000	0.03-128
TILMICOSIN	R	>128.0000	0.12-128
TULATHROMYCIN	I	32.0000	0.03-128

MERCK Animal Health

Things to Consider

- As bacterial exposure to antibiotics increases, so does the occurrence of resistance tendencies in the bacterial populations
- Current antibiotics do what we want them to do. Bacterial populations, after antibiotics have been administered, have higher levels of multi drug resistance

MERCK Animal Health

In Summary

- MAH is a science based company with ruminant headquarters in DeSoto, KS.
- We strive to find solutions to the current issues in ruminant health.
- Our support of the cattle industry goes way beyond the animal health products we sell.
- Research trials are key to assuring our products are performing the way that we expect.

MERCK Animal Health

Thank You!

THANK YOU!

Notes – Notes -- Notes

Receiving diets- Implications on health and performance

Dr. Sean Montgomery
Corn Belt Livestock Services
Kansas State University Adjunct Professor

Receiving diets- Implications on health and performance

Sean P. Montgomery, Ph.D., PAS
Beef Cattle Nutritionist
Corn Belt Livestock Services

Introduction

- The Veterinary Feed Directive (VFD)
  - Becomes law as of January 1st, 2017
  - Will change the use of medically important antibiotics
  - No longer will medically important antibiotics have growth promotion claims
  - The use of medically important antibiotics will require a veterinary prescription

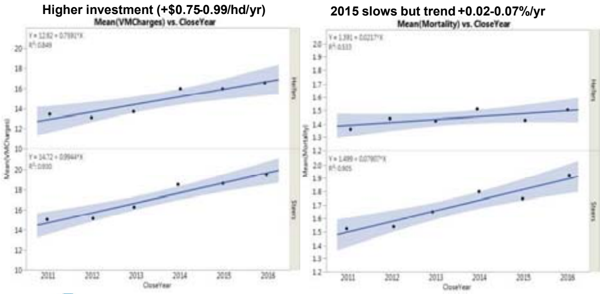
Introduction

- The Veterinary Feed Directive (VFD)
  - The use of medically important antibiotics will only be used to treat specified diseases according to label claims
  - The use of medically important antibiotics will become restricted
  - The importance of nutrition and management practices to decrease disease will become paramount

Vet Med Charges and Mortality

700-799-lb Heifers & Steers – Q1 & Q2 only

Higher investment (+$0.75-0.99/hd/yr) | 2015 slows but trend +0.02-0.07%/yr



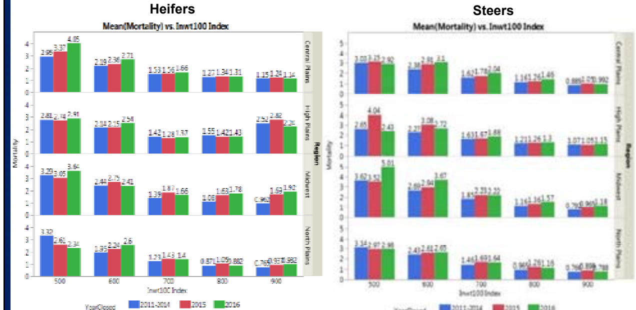
FULL VALUE BEEF

Elanco data on file through AgSpan 2011-2016 Benchmark database
USBBUNON01320(1)

Elanco

Mortality by Region and In Wt

500-999-lb Heifers & Steers – Q1 & Q2 only



FULL VALUE BEEF

Elanco data on file through AgSpan 2011-2016 Benchmark database
USBBUNON01320(1)

Elanco

Bovine Respiratory Disease (BRD)

	Year					
	2008	2009	2010	2011	2012	2013
No. head	1,684	2,112	1,236	1,623	1,852	2,102
BRD, %	0.44[a]	2.2[ab]	2.5[b]	5.8[c]	12.1[d]	7.7[c]

[a,b,c,d]Means within a row with uncommon superscripts differ (*P* ≤ 0.05).

Carroll et al. (2015).

BRD Diagnosis Concerns

- Schneider et al. (2009)
  - Scored lungs from 1,665 cattle
  - Twenty six percent of cattle treated for BRD did not exhibit lung lesions
- Misdiagnosed as BRD?
- Subclinical acidosis can cause similar symptoms as BRD (Miller et al., 2013)
  - In appetence
  - Lethargy

Nutrition

- Newly arrived feedlot cattle typically have depressed feed intakes
- Receiving diets should contain greater concentrations of nutrients
- Increases in receiving diet energy might provide for increased morbidity

NRC (2016).

Dry Matter intake of Newly Arrived Calves (% of BW)

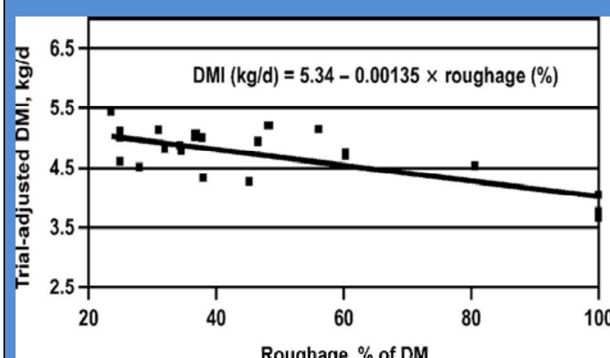
Age, d	Healthy (SD)	Diseased (SD)
0 to 7	1.55 (0.51)	0.90 (0.75)
0 to 14	1.90 (0.50)	1.43 (0.70)
0 to 28	2.71 (0.50)	1.84 (0.66)
0 to 56	3.03 (0.43)	2.68 (0.68)

NRC (2016).

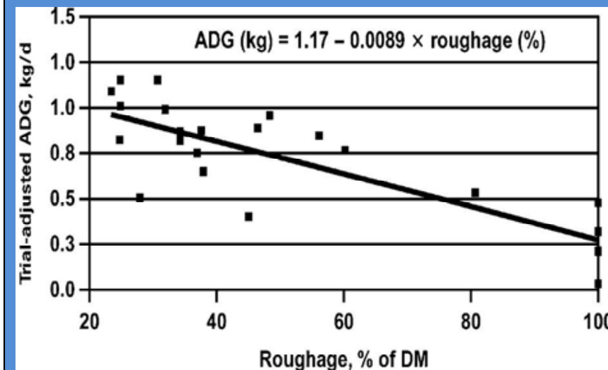
Nutrient Values in Receiving Diets (DM basis)

	NRC (2016)	Samuelson (2016)
CP, %	12-14.5	14.0
Calcium, %	0.6-0.8	1.0
Potassium, %	1.2-1.4	1.0
Magnesium, %	0.2-0.3	0.25
Zinc, ppm	75-100	100
Copper, ppm	10-15	20

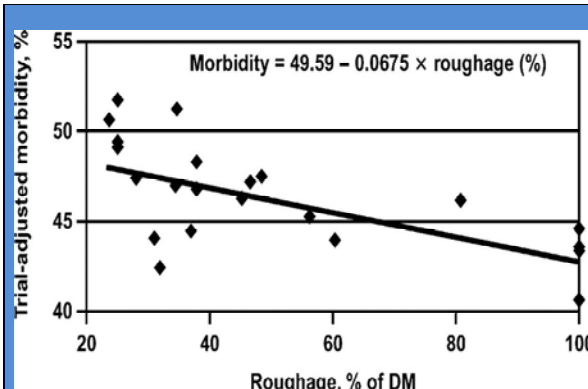
Samuelson et al. (2016).



Rivera et al. (2005).



Rivera et al. (2005).



Rivera et al. (2005).

Trace Minerals

- Trace minerals are important for immune function (Duff and Galyean, 2007)
- Inorganic versus organic sources?
- Supplemented in the diet or injected?

Spore et al. (2016).

Amount and source of Zn, Cu, Mn, and Co

Item	Treatment[a]		
	1x Inorganic	2x Organic	3x/1x Organic
Initial BW, lb	472	469	469
DMI, lb	13.66	13.80	13.16
ADG, lb	2.62	2.76	2.82
F:G	5.26	5.00	4.76

[a]Treatments were fed for 42 days.

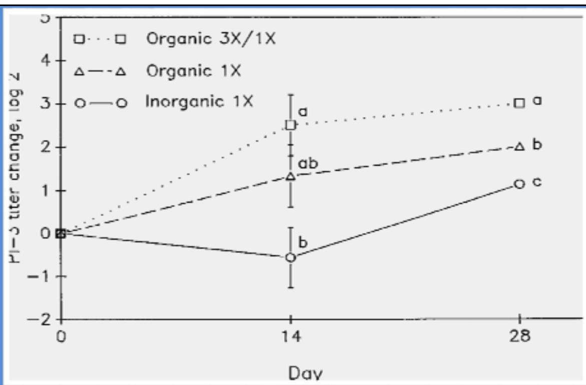
George et al. (1997).

Amount and source of Zn, Cu, Mn, and Co

Item	Treatment[a]		
	1x Inorganic	2x Organic	3x/1x Organic
Number of calves	35	35	35
Number treated for BRD	11[a]	11[a]	6[b]

[a,b]Means within a row with uncommon superscripts differ ($P < 0.05$).

George et al. (1997).



Effect of element source and concentration on PI-3 titer response against modified-live vaccination. [a,b,c]Means within a common period postvaccination with no common letter differ ($P<0.01$). Treatment × period interaction ($P<0.05$).
George et al. (1997).

Injectable Zn, Cu, Mn, Se

Item	Treatment: Control	ITM 1	ITM 2
Initial BW, lb	439	439	439
DMI, lb	11.53[a]	12.47[b]	12.28[b]
ADG, lb	2.00[a]	2.38[b]	2.45[b]
F:G	5.88[a]	5.26[b]	5.00[b]

[a,b]Means within a row with uncommon superscripts differ ($P \leq 0.05$).

Richeson and Kegley (2011).

Injectable Zn, Cu, Mn, Se

Item	Treatment: Control	ITM 1	ITM 2
Morbidity, %	87.1[a]	54.8[b]	67.9[ab]
2nd Treatment	51.6[a]	19.4[b]	17.9[b]
3rd Treatment	32.3[a]	9.7[b]	10.7[b]
Antibiotic calf $/head	13.66[a]	8.07[b]	9.47[b]

[a,b]Means within a row with uncommon superscripts differ ($P \leq 0.05$).

Richeson and Kegley (2011).

Chromium and Vitamin E

- Chromium
  - Increases insulin sensitivity
  - Increased absorption of glucose
  - Enhanced immune response (NRC, 2016)
- Vitamin E
  - BRD morbidity was decreased 0.35% for every 100-IU increase in daily vitamin E intake (Elam, 2006)
  - 400 to 500 IU per head per day (NRC, 2016)

Trace Minerals

- Effect of trace minerals on growth performance and health can be inconsistent
  - Dependent upon trace mineral status upon arrival
  - Can be beneficial when trace mineral stores are depleted

Direct Fed Microbials (DFM)

	Treatment	
Item	Control	DFM
DMI, lb	10.51	10.51
ADG, lb	1.52[a]	3.37[b]
F:G	10.00[a]	9.09[b]
Morbidity, %	41.1[a]	36.6[b]

Means within a row with uncommon superscripts differ ($P < 0.05$).

Gill et al. (1987).

Dried Yeast Product

	Treatment		
Item	Control	YP	*P* =
Initial BW, lb	571	573	0.82
DMI, lb	16.49	16.99	0.76
ADG, lb	3.17	3.37	0.32
F:G	5.56	5.00	0.35
Morbidity, %	6.9	2.0	0.12

Buntyn et al. (2016).

Dried Yeast Product

Item	Treatment: Control	YP	*P* =
Cortisol	29.22	25.22	0.05
TNF-α	12.85	25.94	0.03
IFN-γ	0.76	1.85	0.003
IL-6	1877.66	1849.28	0.87
NEFA	0.21	0.10	0.002

Buntyn et al. (2016).

Megasphaera elsdenii

Item	Treatment: Control	M	*P* =
Initial BW, lb	441	447	0.23
DMI, lb	9.52	10.16	0.01
ADG, lb	1.41	1.76	0.02
F:G	6.67	5.88	0.05
Morbidity, %	37.7	26.4	0.02

Miller et al. (2013).

Megasphaera elsdenii

Item	Treatment: Control	M	*P* =
Morbidity, %	37.7	26.4	0.02
1st Time Treat	32	22	0.02
2nd Time Treat	17.4	11.5	0.03
3rd Time Treat	5.9	4.4	0.36
Medication $/calf	19.70	17.06	0.01

Miller et al. (2013).

Yeast and Microbial Products

- Yeast and microbial products
  - May improve growth performance and health
  - Diets containing corn byproducts?
    - WDGS
      - Residual yeast
    - WCGF
      - Residual lactic acid

Feed Intake Management

- Feed intake management is important for growth performance and health of feedlot cattle
- Cattle can be taught how to consume feed
- Getting a pen of cattle to consume feed as a group decreases within pen intake variation
- Result is more consistent feed intake

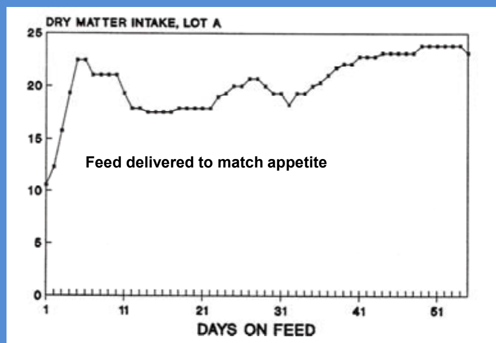
Effect of Varying Feed Delivery 10%

Item	Constant	10% Variation
Initial BW, lb	829	835
Final BW, lb	1100	1089
DMI, lb	17.19	17.19
ADG, lb	3.24[a]	3.02[b]
F:G	5.32[a]	5.71[b]

Means within a row with uncommon superscripts differ ($P < 0.10$).

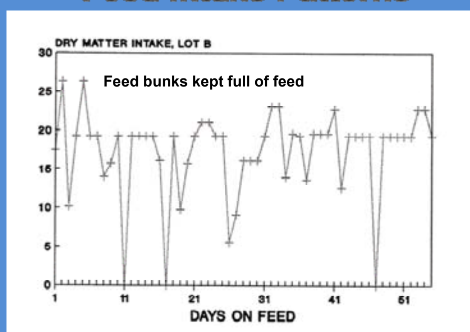
Galyean et al. (1992).

Effects of Bunk Management on Feed Intake Patterns



Pritchard and Brunns (2003).

Effects of Bunk Management on Feed Intake Patterns



Pritchard and Brunns (2003).

Effects of Bunk Management on Growth Performance

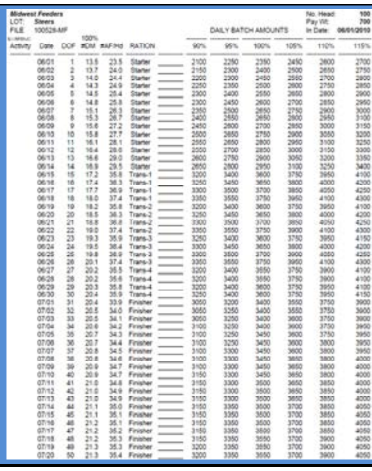
Item	Matched	Full
DMI, lb	20.23	19.73
ADG, lb	3.77[a]	2.07[b]
F:G	5.35[a]	9.62[b]

Means within a row with uncommon superscripts differ ($P < 0.10$).

Pritchard and Brunns (2003).

Bunk Management Case Study

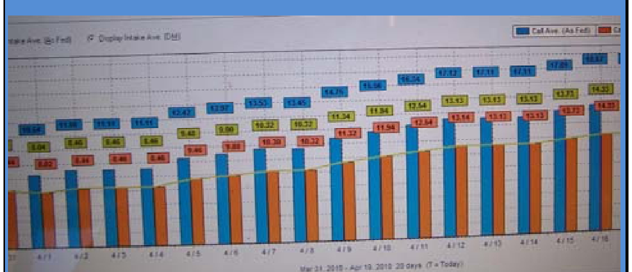
Item	Poor	Better
Initial BW, lb	745	756
Final BW, lb	1258	1329
DMI, lb	19.31	21.71
ADG, lb	2.69	3.13
F:G	7.09	6.90
DOF	185	180
Death loss, %	3.11	1.56

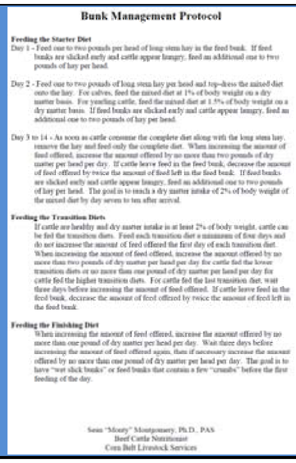


Midwest Feeders
LOT: Steers
FILE: 100528-MF
No. Head 100
Pay Wt 700
In Date 06/01/2010

DAILY BATCH AMOUNTS

Date	DOF	100% #DM	#AF/Hd	RATION		90%	95%	100%	105%	110%	115%
06/01	1	13.5	23.5	Starter		2100	2250	2350	2450	2600	2700
06/02	2	13.7	24.0	Starter		2150	2300	2400	2500	2650	2750
06/03	3	14.0	24.4	Starter		2200	2300	2450	2550	2700	2800
06/04	4	14.3	24.9	Starter		2250	2350	2500	2600	2750	2850
06/05	5	14.5	25.4	Starter		2300	2400	2550	2650	2800	2900
06/06	6	14.8	25.8	Starter		2300	2450	2600	2700	2850	2950
06/07	7	15.1	26.3	Starter		2350	2500	2650	2750	2900	3000
06/08	8	15.3	26.7	Starter		2400	2550	2650	2800	2950	3100
06/09	9	15.6	27.2	Starter		2450	2600	2700	2850	3000	3150
06/10	10	15.8	27.7	Starter		2500	2650	2750	2900	3050	3200
06/11	11	16.1	28.1	Starter		2550	2650	2800	2950	3100	3250
06/12	12	16.4	28.6	Starter		2550	2700	2850	3000	3150	3300
06/13	13	16.6	29.0	Starter		2600	2750	2900	3050	3200	3350
06/14	14	16.9	29.5	Starter		2650	2800	2950	3100	3250	3400
06/15	15	17.2	35.8	Trans-1		3200	3400	3600	3750	3950	4100
06/16	16	17.4	36.3	Trans-1		3250	3450	3650	3800	4000	4200
06/17	17	17.7	36.9	Trans-1		3300	3500	3700	3850	4050	4250
06/18	18	18.0	37.4	Trans-1		3350	3550	3750	3950	4100	4300
06/19	19	18.2	35.8	Trans-2		3200	3400	3600	3750	3950	4100
06/20	20	18.5	36.3	Trans-2		3250	3450	3650	3800	4000	4200
06/21	21	18.8	36.8	Trans-2		3300	3500	3700	3850	4050	4250
06/22	22	19.0	37.4	Trans-2		3350	3550	3750	3900	4100	4300
06/23	23	19.3	35.9	Trans-3		3250	3400	3600	3750	3950	4150
06/24	24	19.5	36.4	Trans-3		3300	3450	3650	3800	4000	4200
06/25	25	19.8	36.9	Trans-3		3300	3500	3700	3900	4050	4250
06/26	26	20.1	37.4	Trans-3		3350	3550	3750	3950	4100	4300
06/27	27	20.2	35.5	Trans-4		3200	3400	3550	3750	3900	4100
06/28	28	20.2	35.6	Trans-4		3200	3400	3550	3750	3900	4100
06/29	29	20.3	35.8	Trans-4		3200	3400	3600	3750	3950	4100
06/30	30	20.4	35.9	Trans-4		3250	3400	3600	3750	3950	4150
07/01	31	20.4	33.9	Finisher		3050	3200	3400	3550	3750	3900
07/02	32	20.5	34.0	Finisher		3050	3250	3400	3550	3750	3900
07/03	33	20.5	34.1	Finisher		3050	3250	3400	3600	3750	3900
07/04	34	20.6	34.2	Finisher		3100	3250	3400	3600	3750	3950
07/05	35	20.7	34.3	Finisher		3100	3250	3450	3600	3750	3950
07/06	36	20.7	34.4	Finisher		3100	3250	3450	3600	3800	3950
07/07	37	20.8	34.5	Finisher		3100	3300	3450	3600	3800	3950
07/08	38	20.8	34.6	Finisher		3100	3300	3450	3650	3800	4000
07/09	39	20.9	34.7	Finisher		3100	3300	3450	3650	3800	4000
07/10	40	20.9	34.7	Finisher		3150	3300	3450	3650	3800	4000
07/11	41	21.0	34.8	Finisher		3150	3300	3500	3650	3850	4000
07/12	42	21.0	34.9	Finisher		3150	3300	3500	3650	3850	4000
07/13	43	21.0	34.9	Finisher		3150	3300	3500	3650	3850	4000
07/14	44	21.1	35.0	Finisher		3150	3350	3500	3700	3850	4050
07/15	45	21.1	35.1	Finisher		3150	3350	3500	3700	3850	4050
07/16	46	21.2	35.1	Finisher		3150	3350	3500	3700	3850	4050
07/17	47	21.2	35.2	Finisher		3150	3350	3500	3700	3850	4050
07/18	48	21.2	35.3	Finisher		3150	3350	3550	3700	3900	4050
07/19	49	21.3	35.3	Finisher		3200	3350	3550	3700	3900	4050
07/20	50	21.3	35.4	Finisher		3200	3350	3550	3700	3900	4050





Bunk Management Protocol

Feeding the Starter Diet

Day 1 - Feed one to two pounds per head of long stem hay in the feed bunk. If feed bunks are slicked early and cattle appear hungry, feed an additional one to two pounds of hay per head.

Day 2 - Feed one to two pounds of long stem hay per head and top-dress the mixed diet onto the hay. For calves, feed the mixed diet at 1% of body weight on a dry matter basis. For yearling cattle, feed the mixed diet at 1.5% of body weight on a dry matter basis. If feed bunks are slicked early and cattle appear hungry, feed an additional one to two pounds of hay per head.

Day 3 to 14 - As soon as cattle consume the complete diet along with the long stem hay, remove the hay and feed only the complete diet. When increasing the amount of feed offered, increase the amount offered by no more than two pounds of dry matter per head per day. If cattle leave feed in the feed bunk, decrease the amount of feed offered by twice the amount of feed left in the feed bunk. If feed bunks are slicked early and cattle appear hungry, feed an additional one to two pounds of hay per head. The goal is to reach a dry matter intake of 2% of body weight of the mixed diet by day seven to ten after arrival.

Feeding the Transition Diets

If cattle are healthy and dry matter intake is at least 2% of body weight, cattle can be fed the transition diets. Feed each transition diet a minimum of four days and do not increase the amount of feed offered the first day of each transition diet. When increasing the amount of feed offered, increase the amount offered by no more than two pounds of dry matter per head per day for cattle fed the lower transition diets or no more than one pound of dry matter per head per day for cattle fed the higher transition diets. For cattle fed the last transition diet, wait three days before increasing the amount of feed offered. If cattle leave feed in the feed bunk, decrease the amount of feed offered by twice the amount of feed left in the feed bunk.

Feeding the Finishing Diet

When increasing the amount of feed offered, increase the amount offered by no more than one pound of dry matter per head per day. Wait three days before increasing the amount of feed offered again, then if necessary increase the amount offered by no more than one pound of dry matter per head per day. The goal is to have "wet slick bunks" or feed bunks that contain a few "crumbs" before the first feeding of the day.

Sean "Monty" Montgomery, Ph.D., PAS
Beef Cattle Nutritionist
Corn Belt Livestock Services

Feed Intake Management

- Feed Intake Management
  - Improves cattle growth performance
  - Improves cattle health
  - Decreases feed waste
  - Decreases cost of gain

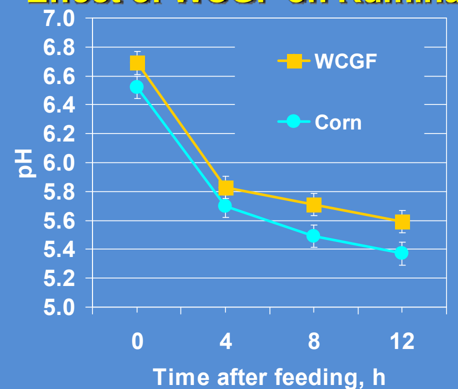
Wet Milling

Corn → Steep
↓
Steep Liquor ← Grind
↓
Separation
Starch
Gluten meal
Oil
↓
Bran
↓
WCGF
↓
DCGF

Nutrient Profile of CGF

Item	% of DM
Protein	20
Fat	3 - 3.5
ADF	12
NDF	40
NE gain	0.60 - 0.65
CP / DIP	20 / 75

Effect of WCGF on Ruminal pH



Effect of WCGF ($P < 0.01$). Montgomery et al. (2004).

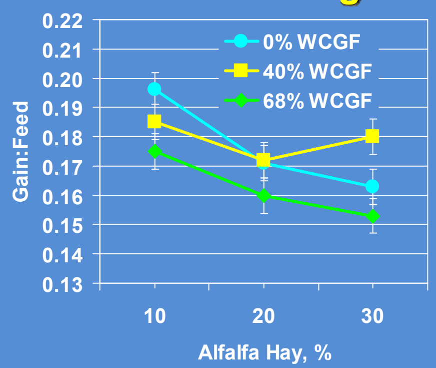
Digestibility and Passage Rate[a]

Item	WCGF	Corn	*P* =
OM	86.8	84.0	0.02
NDF	75.7	58.2	0.01
Starch	96.7	92.7	0.03
Passage rate, %/h	3.8	2.7	0.01

[a]Both diets contained 20% hay; WCGF diet = 40% WCGF.

Montgomery et al. (2004).

WCGF in Growing Diets



AH level × WCGF level interaction ($P < 0.01$). Montgomery et al. (2003).

Effects of Dietary NEg and Intake

- Evaluate effects of dietary NEg and dry matter intake on growth performance and health of newly arrived calves
- Three hundred seventy five heifers
  - Southeast origin
  - Initially weighing 491 pounds
  - Randomized complete block design
  - Blocked by load
  - Experiment lasted 55 days
  - Fed a common diet last 14 days

Spore et al. (2016).

Effects of Dietary NEg and Intake

	Experimental Diets (% of DM)[a]			
Ingredient	45/100	50/95	55/90	60/85
DR Corn	8.57	19.08	28.50	38.82
Supplement	6.43	6.92	7.50	8.18
Alfalfa Hay	22.50	17.00	12.00	6.50
Prairie Hay	22.50	17.00	12.00	6.50
WCGF	40.00	40.00	40.00	40.00

[a]First number = NEg in Mcal/lb of DM. Second number = DMI as a percent of 100.

Spore et al. (2016).

Effects of Dietary NEg and Intake

	Nutrient Composition of Diets (% of DM)[a]			
Item	45/100	50/95	55/90	60/85
CP	16.39	15.94	15.52	15.07
Calcium	0.91	0.86	0.82	0.79
Phosphorus	0.53	0.54	0.55	0.56
Salt	0.32	0.35	0.38	0.41
Potassium	1.39	1.24	1.11	0.96
NEg, Mcal/lb	45.28	50.40	55.01	60.06

[a]First number = NEg in Mcal/lb of DM. Second number = DMI as a percent of 100.

Spore et al. (2016).

Effects of Dietary NEg and Intake

	Treatment[a]			
Item	45/100	50/95	55/90	60/85
Initial BW, lb	490	493	490	491
Final BW, lb	614	617	616	623
DMI, lb	14.51[b]	13.51[bc]	12.88[c]	12.51[c]
ADG, lb	2.26	2.25	2.29	2.40
Feed:Gain	6.48[b]	6.12[b]	5.65[bc]	5.22[c]

[a]First number = NEg in Mcal/lb of DM. Second number = DMI as a percent of 100.

[b,c]Means within a row with uncommon superscripts differ ($P < 0.05$).

Spore et al. (2016).

Effects of Dietary NEg and Intake

	Treatment[a]			
Item	45/100	50/95	55/90	60/85
Morbidity, %	11.5	13.0	12.8	12.9
Mortality, %	4.2	4.3	2.1	4.3

[a]First number = NEg in Mcal/lb of DM. Second number = DMI as a percent of 100.

[b,c]Means within a row with uncommon superscripts differ ($P < 0.05$).

Spore et al. (2016).

Effects Dietary NEg and Intake

- High energy diets containing WCGF can be fed to newly arrived calves at restricted dry matter intakes
  - Improved growth performance
  - No difference in health
- Potential to eliminate step up diets?

Spore et al. (2016).

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Notes – Notes -- Notes

Parasite and Fly Control Options

Dr. Justin Talley
Oklahoma State University

Parasite and Fly Control Options

Justin Talley Ph.D.
Extension Livestock Entomologist
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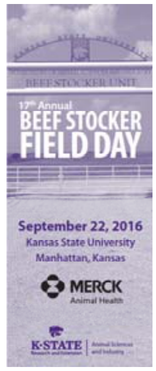


EXTENSION

Why we treat for parasites

- Reduces productivity of the animal
- Reduces the animal's ability to utilize its diet
- Well being of animal and us ($$$$)

Table 1. Effects of pharmaceutical technologies on breakeven price in stocker cattle

Technology	Effect on breakeven	Increased breakeven ($/head) without the technology
Implants	12.85%	$18.19
Ionophores	7.74%	$11.51
Dewormers	17.79%	$20.77
Fly control	8.09%	$6.28
Sub-therapeutic antibiotics	6.87%	$9.57

Source: Economic Analysis of Pharmaceutical Technologies in Modern Beef Production, John D. Lawrence and Maro A. Ibarburu, Iowa State University

EXTENSION

Effects

Clinical
- Roughness of coat, Anemia, Diarrhea, etc.

Sub-clinical
- Feeding efficiency
  - Weight gain
- Immune response
  - etc.

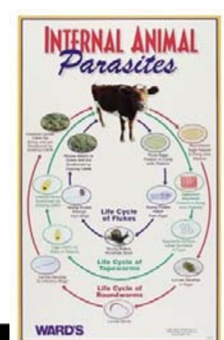
The sub-clinical effects are more important to a producer

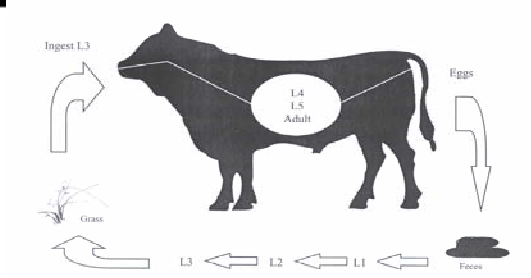
Important worms

- **Roundworms (nematodes)**
  - Most important internal parasite in cattle
- Tapeworms (cestodes)
  - Can infect cattle but have minimal effect
- Flukes (trematodes)
  - Region specific and depends on areas with a lot of snails
- Coccida (protozoan)
  - Can be a problem but this talk will focus on roundworms

Parasite's Life Cycle

- **3 stages of life cycle**
  - **developmental stage (outside animal)**
  - **Pre-adult stage (time from ingestion until capable of producing viable eggs)**
    - Also known as prepatent stage
  - **adult stage (also known as patent stage)**

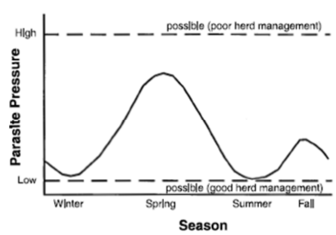




Developmental Period

- "spring rise"
- L3 can survive freezing conditions
- eggs survive dry drought conditions

"Spring Rise"

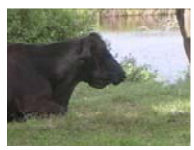


Classes of dewormers

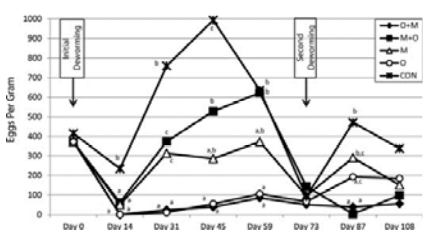
1. Benzimidozoles (white oral dewormers) have a broad spectrum of activity, but no residual effect
   a. oxfendazole, albendazole or fenbendazole
2. Levamisole is only effective against adult worms, has no residual effect, and can't reach arrested larval stages
3. Macrocyclic lactone retain high blood level for a period of time (residual), so any incoming worms will be killed
   a. ivermectin, doramectin, eprinomectin or moxidectin

Deworming Programs (3 types)

- **therapeutic program**
- **tactical program**
- **strategic program**



Deworming Strategies for Stockers

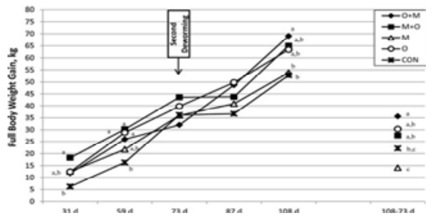


Fecal egg count response to anthelmintic treatment strategies. Average eggs per gram for each treatment at each collection point are evaluated. Samples for fecal egg count were collected on d 0, 14, 31, 45, 59, 73, 87, and 108.

- Synanthic® 22.5% oral suspension had the greatest efficacy at reducing roundworms in stockers either alone or in combination with Cydectin®.

Walker et al. 2013. Veterinary Parasitology 197: 152–159

Deworming Strategies for Stockers



Full BW gain 35 d following the second deworming (d 108 – d 73) was statistically similar for the O + M (78.5 lbs), M + O (60.8 lbs), and O (66.8 lbs) treated calves and statistically different compared to the M (31.1 lbs) treated calves.

Walker et al. 2013. Veterinary Parasitology 197: 152–159

Effects of anthelmintic treatment strategies on stocker calf performance over time. Sample estimates within day without a common superscript were determined significant by the Tukey protected pairwise comparison procedure with overall protection set at P = 0.10. Mean Full BW gain was calculated by subtracting full BW for d 31, 59, 73, 87, and 108 estimated initial full BW.

Deworming Strategies for Stockers

Worm recovery at day 14 of the fecal egg count reduction test study.

14 days RX	Abomasum			Small Intestine
Fbz	Hae	Oster	Cooperia	Cooperia
9	0	0	0	100
38	0	0	0	400
53	0	0	0	0
Dor				
44	0	0	100	31,500
96	0	0	100	6,600
186	0	0	200	35,700

Abbreviations: Hae = Haemonchus, Oster = Ostertagia, Fbz = fenbendazole, Dor = doramectin.

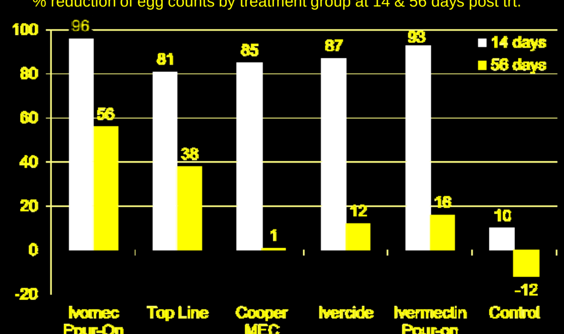
Efficacy of the macrocyclic lactone treated group was 8.8% while the efficacy of the benzimidazole was 98.1%. While there was a dramatic reduction in the egg counts and worm recoveries in the two classes of anthelmintics, there were no significant differences in ADG or DMI over the 14 day period.

Stromberg, B.E., L.C. Gasbarre, A. Waite, D.T. Bechtol, M.S. Brown, N.A. Robinson, E.J. Olson, H. Newcomb
Cooperia punctata: effect on cattle productivity?
Vet. Parasitol., 183 (2012), pp. 284–291

Pour-on Ivermectins

(Yazwinski et al. 2004)

% reduction of egg counts by treatment group at 14 & 56 days post trt.



Dewormer Resistance

- Means we will have to rely on techniques other than dewormers to control worms
- Animal selection
- Pasture rotation
- Burning
- Low stocking rates, etc

Levels at which worm resistance to anthelmintics is effected

1. Farm level practices
   - Do not weigh animals when we treat
   - Under dose animals then stipulating to resistance
   - Too much pour-on (80% of products available)
2. Product to product variations
   - Generics vs. trade name products

Levels at which worm resistance to anthelmintics is effected

3. Animal to animal differences
   - Identical animals showed a 30-40% variation of how much product gets to the worm
4. Worm behavioral adaptation to the chemicals
5. Molecular changes in the worms
   - Certain molecules can detoxify the chemical

Take Home for Internal Parasites

- Stockers face higher worm burdens than other sectors of the beef industry
- Strategic deworming program is the only program that reduces pasture contamination
- White dewormers still work especially on *Cooperia* worms that have shown high levels of resistance to ivermectin and moxidectin
- Resistance is already an issue and stocker operators need to have the mindset to adjust by providing a refugia (untreated animals)
- Identify high carriers by a FEC and be sure they get treated properly

Fly Control

Estimated Economic Losses in U.S. Cattle Due to Arthropods

Horn Flies	**$1.36 billion**
Stable Flies	**$672 million**
Horse Flies	**$296 million**
Face Flies	**$191 million**
Ticks	**$162 million**
Mosquitoes	**$78 million**
Lice	**$59 million**

Based on Kunz et al 1991 and adjusted for inflation rates

Damages

Beef producers lose millions of dollars due to horn flies by:

- Reduced weight gains
- Less efficient use of forage
- Treatment of diseases transmitted
- Direct physical harm or damage
- Cost of trying to control or reduce pest populations

Blood Sucking Flies

- Horn flies
- Stable flies
- Horse and Deer flies

Influence of horn fly infestations on physiological measurements of beef steers.[a]

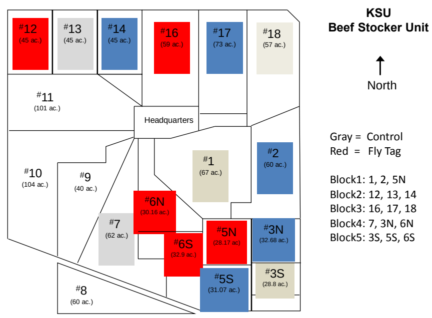
	Horn flies /animal		
Item	0	100	500
Heart rate /min[b]	76.6	89.1	101.1
Respiration rate / min[b]	44.6	52.7	62.1
Rectal Temp., °F[b]	101.8	102.2	102.4
Water intake, gal./day	4.4[c]	4.3[c]	6.6[d]
Urine output, gal./day	1.0[c]	1.1[c]	3.2[d]
Feed intake, lbs. DM/day	12.4	12.4	12.4
Nitrogen intake, grams/day	119.1	118.0	119.1
Fecal nitrogen, grams/day	30.9	34.5	34.8
Urine nitrogen, grams/day	24.6[c]	31.1[cd]	34.7[d]
Nitrogen retained, grams/day	63.6[c]	50.2[d]	49.5[d]

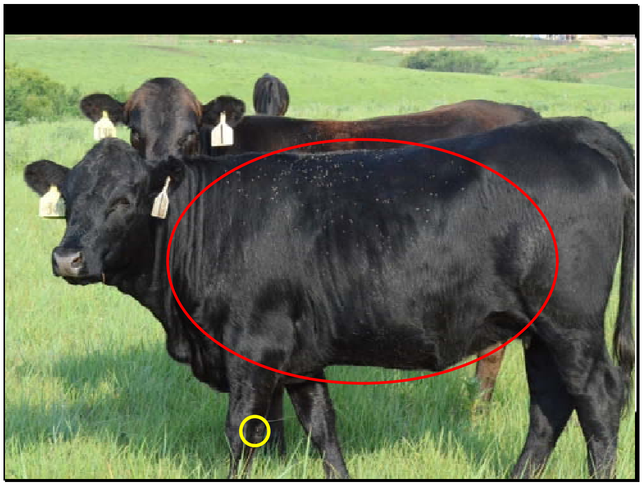
[a] Byford et al., 1992 and Schwinghammer et al., 1986
[b] Row values differ (P = 0.05)
[c,d] Row values differ with different superscript (P = 0.05)

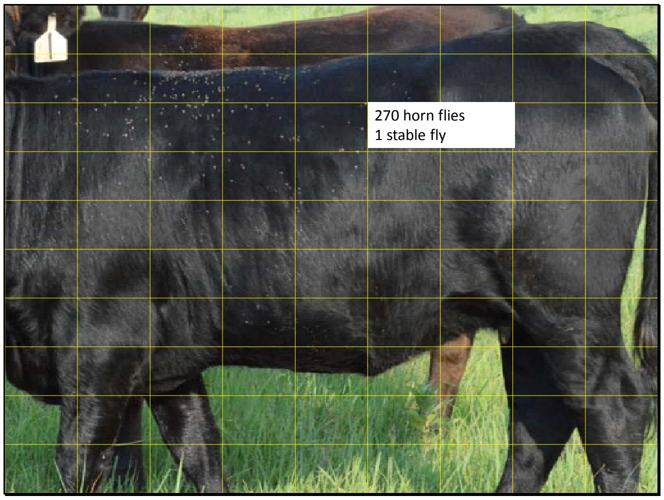
Amount of Blood Loss

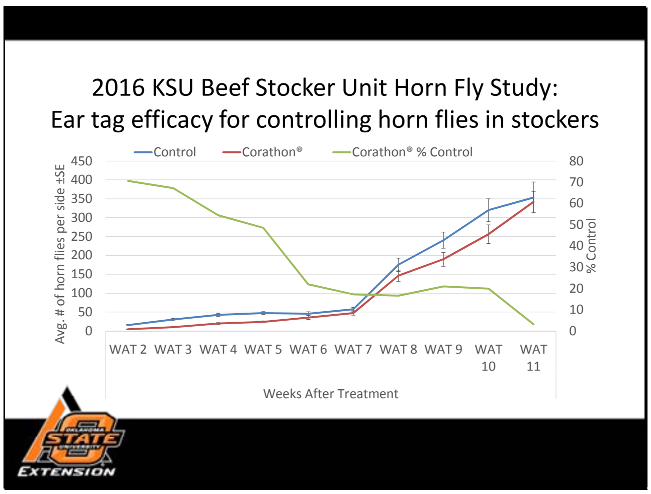
- The average meal size is only **1.5 mg, or 10 µL, of blood per feeding** (Kuramochi and Nishijima 1980), each fly takes between **24 to 38 blood meals per day** (Foil and Hogsette 1994).
- Therefore, the sheer numbers of flies infesting an animal, as well as the numbers of blood meals taken daily by each fly, can result in substantial blood loss (Harris et al. 1974).

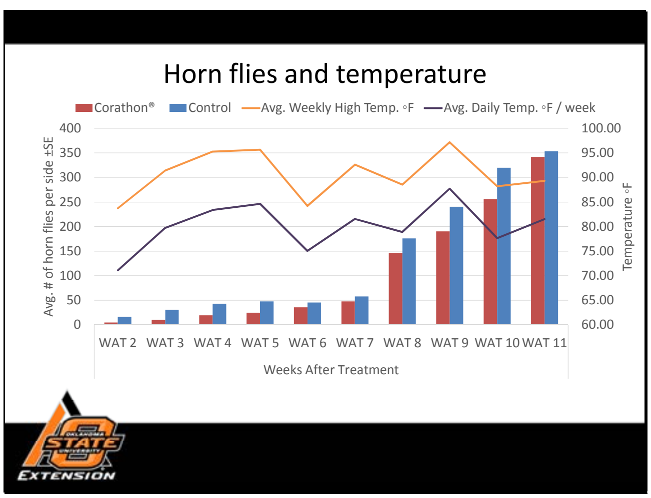
2016 KSU Beef Stocker Fly Trial






270 horn flies
1 stable fly

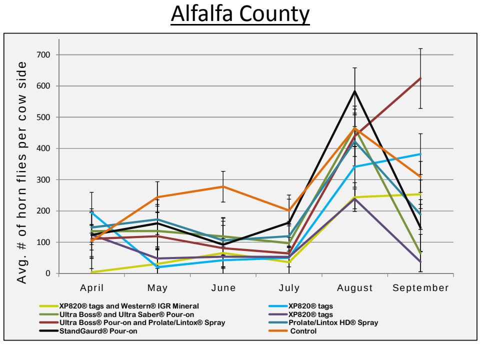

2016 KSU Beef Stocker Unit Horn Fly Study:
Ear tag efficacy for controlling horn flies in stockers
Control
Corathon®
Corathon® % Control
Avg. # of horn flies per side ±SE
% Control
WAT 2 WAT 3 WAT 4 WAT 5 WAT 6 WAT 7 WAT 8 WAT 9 WAT 10 WAT 11
Weeks After Treatment
OKLAHOMA STATE UNIVERSITY
EXTENSION


Horn flies and temperature
Corathon®
Control
Avg. Weekly High Temp. °F
Avg. Daily Temp. °F / week
Avg. # of horn flies per side ±SE
Temperature °F
WAT 2 WAT 3 WAT 4 WAT 5 WAT 6 WAT 7 WAT 8 WAT 9 WAT 10 WAT 11
Weeks After Treatment
OKLAHOMA STATE UNIVERSITY
EXTENSION

Weight gains for 2016 KSU Beef Stocker Fly Trial

24 hr. shrunk 90 day ADG (lbs.)			
	Implant Treatment	Implant	
Fly Treatment	Control	Ralgro®	Rev G®
Control	1.01	1.31	1.42
Corathon® Ear Tag	1.39	1.48	1.50

Alfalfa County



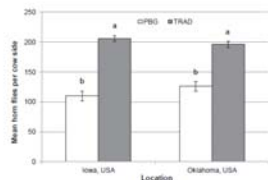
Cost Comparison

Type of Product	Lasting effect of One Treatment	Cost per Treatment per Head	Total Cost per Head (5 month period)
Insecticidal Impregnated Ear Tag	12-20 weeks	$3.20-4.45	$3.20-4.45
Insecticidal Pour-on	3-4 weeks	$.50-1.90	$2.50-9.50
Insecticidal Spray	3-4 weeks		$45.00-60.00*
VetGun® Application	3-4 weeks	$2.00 per dose	$10.00

* Cost of one gallon of popular insecticidal sprays

Burning impacts horn fly populations

- Patch-burn grazing management resulted in 41% reduction of horn flies, less than in the traditional management system



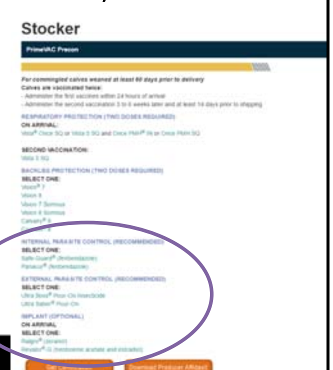
Scasta et al., 2012 Southwestern Entomologist

Take Home for Fly Control

- Horn flies are usually the biggest fly pest associated with summer grazing stockers
- 2016 KSU Beef Stocker Trial demonstrated that applying one tag per animal will provide approximately 7 weeks of control
- Fly control combined with an implant demonstrated to have the highest weight gains
- Combination of ear tags and feeding an IGR product demonstrated good fly control
- Costs can add up if re-application of product is required to manage fly populations
- Burning reduces fly populations

Overall Summary

- Internal parasite control combined with some type of fly control program with an added benefit of utilizing an implant will increase performance



Acknowledgements

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- Will Hollenbeck, KSU Beef Stocker Unit
- Tyler Spore, KSU Animal Sciences and Industry
- Kylie Sherrill, OSU Livestock Entomology Lab

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Questions

www.livestockbugs.okstate.edu

www.beefextension.com

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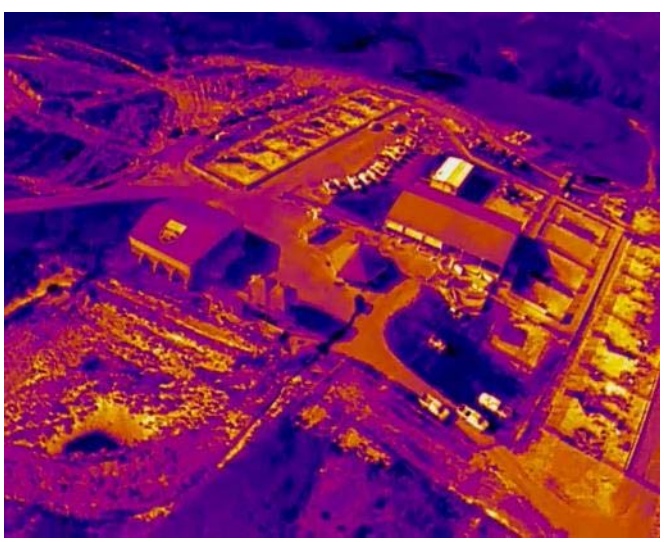
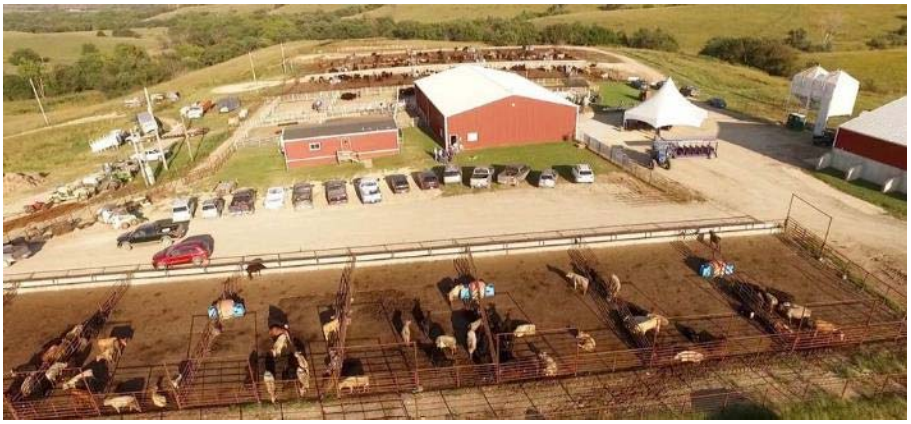
Notes – Notes -- Notes

Technology Applications for Beef Cattle Operations

Dr. Ray Asebedo
Kansas State University





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