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Trends and Opportunities in Calf and Heifer Rearing Costs

Matt Akins
UW-Madison Dairy Science

Vita Plus Dairy Calf Summit 2018



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Heifer Management Goals:

- Calve between 22 and 24 months of age
- Minimize nutrient excretion
- Don't reduce lactation performance
- Control input costs



Recent On-farm Surveys of Costs in WI

- Calves : 2013 - Comparison of different operation types
2017 - Individual and automated calf feeding operations
- Heifers : 2015 update of 2013 survey data
 - Updated feed costs



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Calf Rearing Costs



2013 ICPA Project

13 County and UW-Extension Collaborators

36 Wisconsin operations

- Tie-stall operations
- Free-stall operations
- Custom calf and/or heifer grower operations

12 different counties



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Cost of Raising a Calf in Wisconsin*

	1999	2007	2013
Total Cost	\$160.26	\$326.07	\$363.69
Daily Cost	\$2.68	\$5.31	\$5.34
Days on Feed	59.7	61.36	68.6
Weaning Age (weeks)	7.4	7.04	7.61

*Does not include calf value



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Cost Per Day To Raise A Calf

Calf Cost per Day*

	Tie-Stall	Free-Stall	Grower	All
Feed Costs	\$2.44	\$2.36	\$2.00	\$2.37
Paid Labor & Management	\$0.74	\$1.12	\$0.95	\$0.99
Other Variable Costs	\$0.70	\$0.86	\$0.73	\$0.80
Fixed Costs	\$0.21	\$0.50	\$0.21	\$0.35
Total Cost	\$5.63	\$5.79	\$3.92	\$5.51

*Does not include calf value

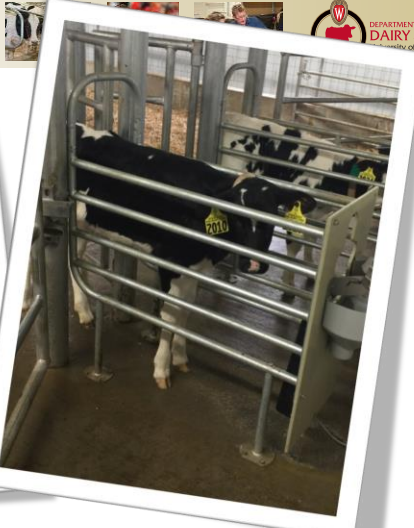


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The shift to group-housed feeding systems

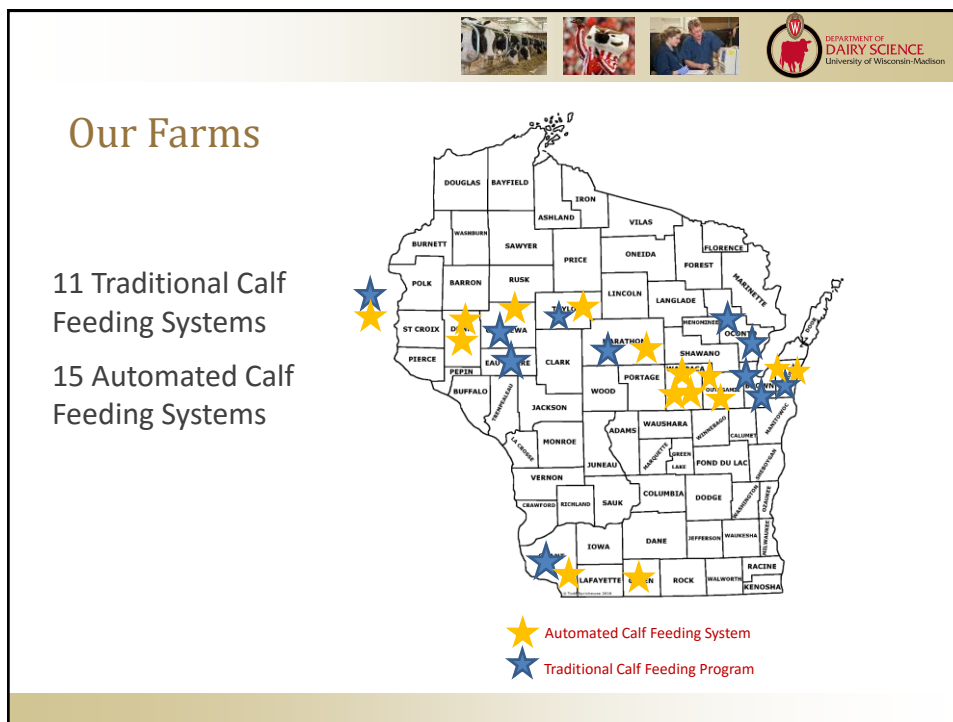
- Increased labor efficiency
 - Shift from physical labor to management
 - Employee challenges
- Calf well-being
 - Socialization
 - Natural behaviors


Source: J. Bentley, Leave No Calf Behind Series: [Considerations for Success of Automatic Calf Feeding Systems](#)



2017 Intuitive Cost of Production Analysis

Individual versus Automated Calf Feeding




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Key Calf Assumptions

Item	
Calf Value	\$200
Labor (paid and unpaid)	\$13 per hour
Management (paid and unpaid)	\$22 per hour
Interest rate	4.5%
Waste milk (non-saleable)	\$8 per cwt (feed costs)
Whole milk (saleable)	\$17 per cwt (market value)
Replacement Value of Calf Housing*	
Homemade calf hutch	\$200
Purchased calf hutch	\$400
Greenhouse barn	\$10 per square foot
Post-frame calf building	\$15.50 per square foot

**Provided by UW-Extension Dairy Engineering Specialist David Kammel, 2017*



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Historical Cost of Raising a Calf in WI

Birth to Time When Moved to Transition Housing

	1999	2007	2013	2017 Individual Housing	2017 Autofeeder
Total Cost	\$160.26	\$326.07	\$363.69	\$419.62	\$431.19
Daily Cost	\$2.68	\$5.42	\$5.51	\$5.84	\$6.35
Days on Feed (birth to moving)	59.70	61.36	68.60	70.32	67.85
Weaning Age					
Weeks	7.40	7.04	7.61	7.86	7.96
Days	51.80	49.28	53.27	55.02	55.72



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Cost of Raising a Calf - Total

Birth to Time When Moved to Transition

	Cost per Calf*	
	Individual (n=11)	Automated (n=15)
Feed costs	\$165.53	\$202.00
Liquid	\$111.95	\$140.50
Starter	\$53.26	\$60.96
Paid Labor & Management	\$116.52	\$74.13
Other Variable Costs	\$40.75	\$47.76
Fixed Costs	\$40.89	\$77.69
Total Allocated Cost	\$363.69	\$401.58
Unpaid Labor/Management	\$55.93	\$29.61
Allocated Cost + Unpaid Labor/Mgmt	\$419.62	\$431.19

*Does not include calf value



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Cost of Raising a Calf - Daily

Birth to Time When Moved to Transition

	Cost per Calf*	
	Individual (n=11)	Automated (n=15)
Feed costs	\$2.35	\$2.93
Liquid	\$1.60	\$2.08
Starter	\$0.75	\$0.84
Paid Labor & Management	\$1.57	\$1.18
Other Variable Costs	\$0.59	\$0.73
Fixed Costs	\$0.58	\$1.13
Total Allocated Cost	\$5.09	\$5.97
Unpaid Labor/Management	\$0.75	\$0.38
Allocated Cost + Unpaid Labor/Mgmt	\$5.84	\$6.35

*Does not include calf value



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Feeding Costs

		Individual	Automated
Liquid feed	\$/calf/day	\$1.60	\$2.08
Starter	\$/calf/day	\$0.75	\$0.84
Milk Replacer cost	\$/calf/day	\$1.46	\$2.56
Milk Replacer powder	lb/calf	79.7	134.4
Whole milk cost	\$/calf/day	\$1.18	\$1.27
Whole milk solids (12.5%)	lb/calf	106.9	115.2
Balancer cost	\$/calf/day	\$0.30	\$0.33
Balancer (if feeding whole milk)	lb/calf	11.8	15.5



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Liquid Feeding Costs

Milk replacer cost	\$/lb powder	1.34
Pasteurized whole milk (includes pasteurizer cost)	\$/lb solids or \$/gallon	0.77

- Operations feeding higher milk amounts can reduce cost by using pasteurized whole milk
- Avg. cost of pasteurizer/lb solids = \$0.05/lb solids
- Some farms used salable milk for feeding since not enough waste milk



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Fixed Costs: Housing & Equipment

		Individual	Automated
Housing	\$/calf/day	0.39	0.80
Equipment	\$/calf/day	0.19	0.33

- Automated facilities higher due to newer facilities
- All automated systems less than 10 years old
 - Many traditional systems over 20 years old
- New facilities had less depreciation
 - As facilities age, difference will likely lessen



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Labor & Management

		Individual	Automated
Labor (paid & unpaid)	\$/calf/day	\$1.99	\$1.30
Management (paid & unpaid)	\$/calf/day	\$0.33	\$0.26
Labor & Management Required	hours/calf	12.5	7.4
Labor Efficiency	calves/hour	7.8	11.6
	calves/day	62.7	93.2



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Take home messages

- Autofeeder operations had higher liquid feeding costs
 - Use of whole milk helped control costs in both 2013 and 2017 data
- Paid and unpaid labor costs lower for autofeeder operations
 - Management costs similar
- Housing/equipment costs higher for autofeeder operations
 - Newer facilities; difference may lessen over time
 - Possibility of using lower cost group feeders?



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Heifer Rearing Costs 2015 feed costs update



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Heifers: Key Assumption Feed Cost Updates

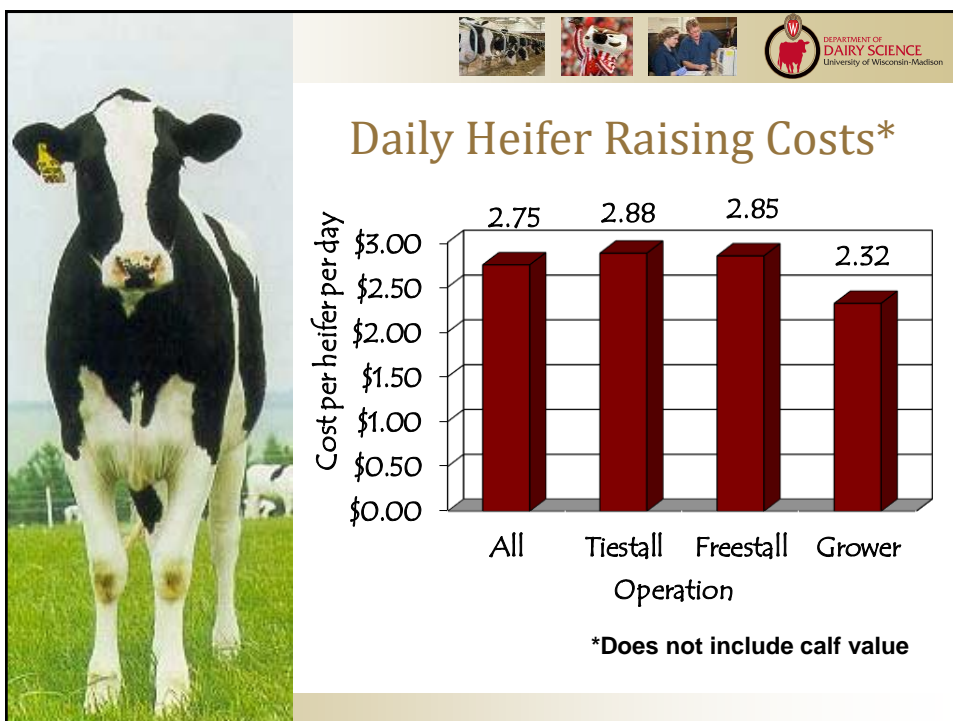



Feed Costs per ton DM:	2013	2015
Legume Silage	\$200	\$150
Corn Silage	\$140	\$100
Corn	\$250	\$170
Weigh-backs	\$150	\$100
Soybean Meal	\$375	\$350

Cost of Raising a Heifer in Wisconsin*

	1999	2007	2013	2015
Total Cost	\$1099.12	\$1322.70	\$1905.13	\$1730.29
Daily Cost	\$1.61	\$2.04	\$3.07	\$2.75
Days on Feed	683	648	630	630

*Does not include calf value



				
Cost Per Day To Raise A Heifer				
Heifer Cost per Day*				
	Tiestall	Freestall	Grower	All
Feed Costs	\$1.37	\$1.58	\$1.31	\$1.44
Labor & Management	\$0.66	\$0.51	\$0.39	\$0.54
Other Variable Costs	\$0.44	\$0.45	\$0.33	\$0.42
Fixed Costs	\$0.42	\$0.33	\$0.29	\$0.35
Total Cost	\$2.88	\$2.85	\$2.32	\$2.75
*Does not include \$400 calf value				

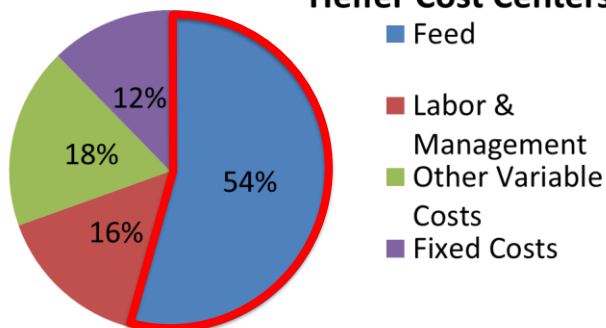
Total Cost to Raise a Dairy Replacement from Birth to Freshening*				
	1999	2007	2013	2015
Total Cost	\$1259.38	\$1648.77	\$2268.82	\$2105.11
Days on Feed	743	709	699	699
Calving Age (months)	24.6	23.9	23.4	23.4
*Does not include calf value				



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\$1800-2200 expenses birth to calving

Heifer Cost Centers



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How to raise heifers more cost efficiently??

Sufficient number of heifers

Reduce days on feed

Feed bunk management

Management

High fiber forages

By-products

Limit-feeding

Grazing

Feeding strategies



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Number of Heifers Needed?

Depends on:

- Cow population
- Cow culling rate
- Heifer 1st calving date
- Calf/Heifer culling rate
- Expanding?



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How many heifers do we need?

Heifer Replacement Tool - Dairygmt.info

← → ↻ 🏠

dairygmt.uwisc.edu/index.php 120% dairygmt

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🔗 Most Visited 📖 Getting Started

Dairy Management DEPARTMENT OF DAIRY SCIENCE University of Wisconsin-Madison

HOME TOOLS PROJECTS PUBLICATIONS PRESENTATIONS LINKS

UW Dairy Management Decision Support TOOLS

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The UW2020-funded "Virtual...
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Jan 30, 2018

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Heifer Replacement





Herd Size	(# Adult Cow)	500
Calf-Heifer Culling Rate	(%/year)	5%
Average Age to Pregnancy	(month)	14.7
Adult Cow Culling Rate	(%/year)	30%
Required Replacement Animals (# Animals)		333

Typical yearly calvings ~430 live calves/year

200 live heifers produced/year to enter herd

400 total replacements with a 24 month age at first calving

-Potential to cull 20-25 heifers/year





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Culling Decisions

- Based on accurate, reliable data
 - Genomics; Pedigrees
 - Disease incidence?
- Timing?
 - Earlier = lowers rearing costs
 - Later = lower risk of insufficient replacements
- Use of selective breeding
 - Sexed semen and beef semen

Premium Beef Tool

Premium Beef on Dairy Program
 V.E. Cabrera¹ and G. Lopes²
¹UW-Madison Dairy Science, ²Accelerated Genetics

Number of adult cows: 500
 Current herd turnover ratio: 30%
 Current adult herd 21-d pregnancy rate: 25%
 Current heifer conception rate at 1st service: 55%
 Current heifer services with sexed semen: 0
 Stillbirth + calf mortality: 7%
 Female calvings required 9 months from now: 129

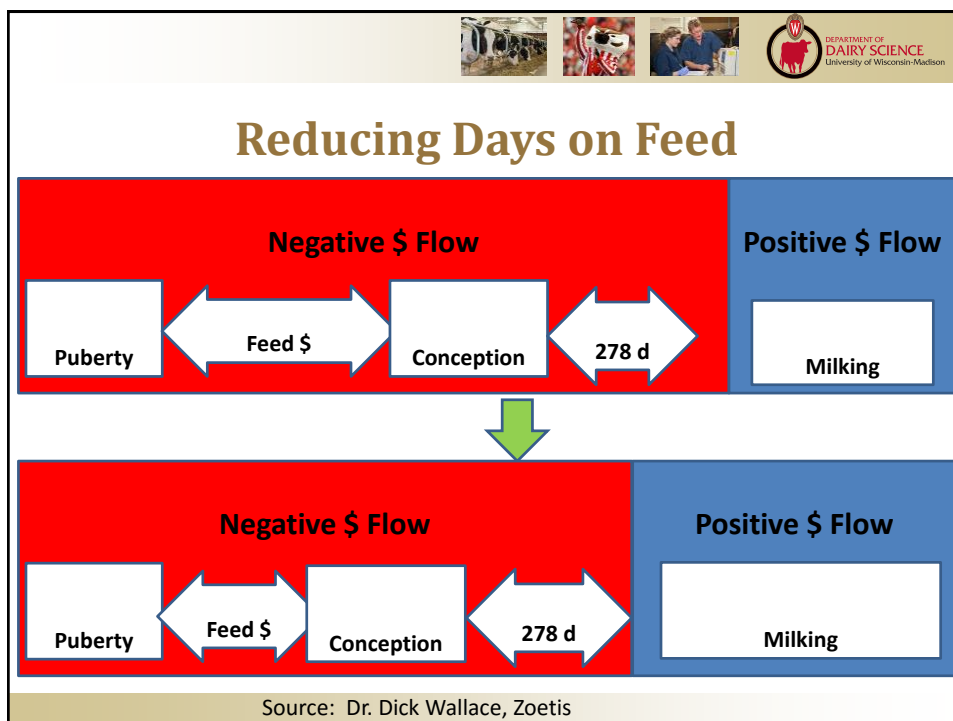
Top 80% heifers = sexed semen
 All others = conventional

	Male and Female Calves by Semen Type						
	C		S		B		
	Male	Female	Male	Female	Male	Female	
Calf value, \$	\$100	\$100	\$100	\$100	\$200	\$200	
Calves, #	80	71	10	93	0	0	163
Return, \$	7,965	7,063	1,031	9,282	0	0	25,341
Semen cost, \$	5,894		9,241		0		15,135
Eartag cost, \$	40	35	5	46	0	0	127
NET RETURN, \$							10,079

Top 80% heifers = sexed semen
 Top 80% cows = conventional
 Bottom 20% cows/heifers = beef semen

	Male and Female Calves by Semen Type						
	C		S		B		
	Male	Female	Male	Female	Male	Female	
Calf value, \$	\$100	\$100	\$100	\$100	\$200	\$200	
Calves, #	50	44	10	93	50	0	137
Return, \$	5,005	4,439	1,031	9,282	10,026	0	29,783
Semen cost, \$	4,022		9,241		1,872		15,135
Eartag cost, \$	25	22	5	46	150	0	249
NET RETURN, \$							14,399

Does not account for reduced heifer rearing costs





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Reduce Days on Feed

Get heifers pregnant by 15 months

- Start breeding at 13 months
- Adequate pre-breeding growth rate (1.8 - 2.0 lb/day)
 - 55% of mature weight (825-900 lb Holsteins)
- Excellent repro program

UW Heifer Pregnancy Rate Tool



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Calving Age (Averages and Variance)

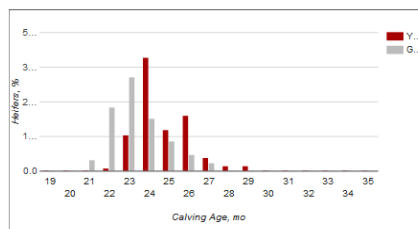
	Your Herd	Goals
Statistics Summary		
Average age @ first calving, mo	25.3	23-24 mo
Minimum calving age, mo	22.6	n/a
Maximum calving age, mo	29.1	n/a
Heifers calving/year, n	85.0	n/a
Calving age deviation, mo	1.4	<1.7 mo
Kurtosis	0.1	n/a
Skewness	0.7	> 1.5
Range and Variance		
Youngest calving age (typical), mo	23.0	> 21 mo
Oldest calving age (typical), mo	28.4	< 28 mo
Calving age range (typical), mo	5.4	< 6.0
Days on feed variance, d	165	< 200
Calving body weight variance, lbs	281	< 325

Herd:

Address:

City, State, Zip:

Email:



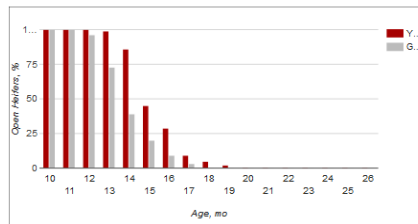
Breeding Efficiency

True heifer pregnancy rate®, %/mo	43.0	> 42.5
Average pregnancy age, mo	16.3	14.0-14.5
First (start) breeding age, mo	14.0	12.5-13.0




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Rearing Cost

Excess rearing days, days/heifer	23.5	0 days
Excess rearing cost, \$/heifer	52.9	\$0
Excess herd rearing days, days/herd	2000	0 days
Excess rearing cost, \$/herd	4500	\$0



UW Heifer Pregnancy Rate Tool

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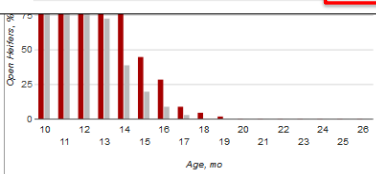
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Rearing Cost

Excess rearing days, days/heifer	23.5	0 days
Excess rearing cost, \$/heifer	52.9	\$0
Excess herd rearing days, days/herd	2000	0 days
Excess rearing cost, \$/herd	4500	\$0

Rearing Cost

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Excess rearing cost, \$/herd	4500	\$0




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Feeding Strategies: Higher Fiber Forages



- Heifers eat ~1% of body weight as NDF
- 1000 lb heifer will eat ~10 lb NDF
- Corn silage/haylage diet: 45% NDF
 - 22 lb DM intake
 - Cost: \$0.07/lb DM = **\$1.54 per day**
- Higher fiber diet (grasses; added stover/straw): 50% NDF
 - 20 lb DM intake
 - Cost: \$0.07/lb DM = **\$1.40 per day**



Potential forages

Forage Sorghums

Gamagrass



Take Home Messages

Opportunities to Control Heifer Costs:

- Manage heifer numbers and days on feed
 - Effective reproduction program
- Use a feeding strategy to control feed intake and costs for bred heifers
 - Feed bunk monitoring



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Mooving Forward.

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Thank You!

fyi.uwex.edu/heifermgmt/