



Economic value of a dairy cow and optimal replacement policies: Part 1

V.E. Cabrera

University of Wisconsin-Madison Dairy Science

Rationale

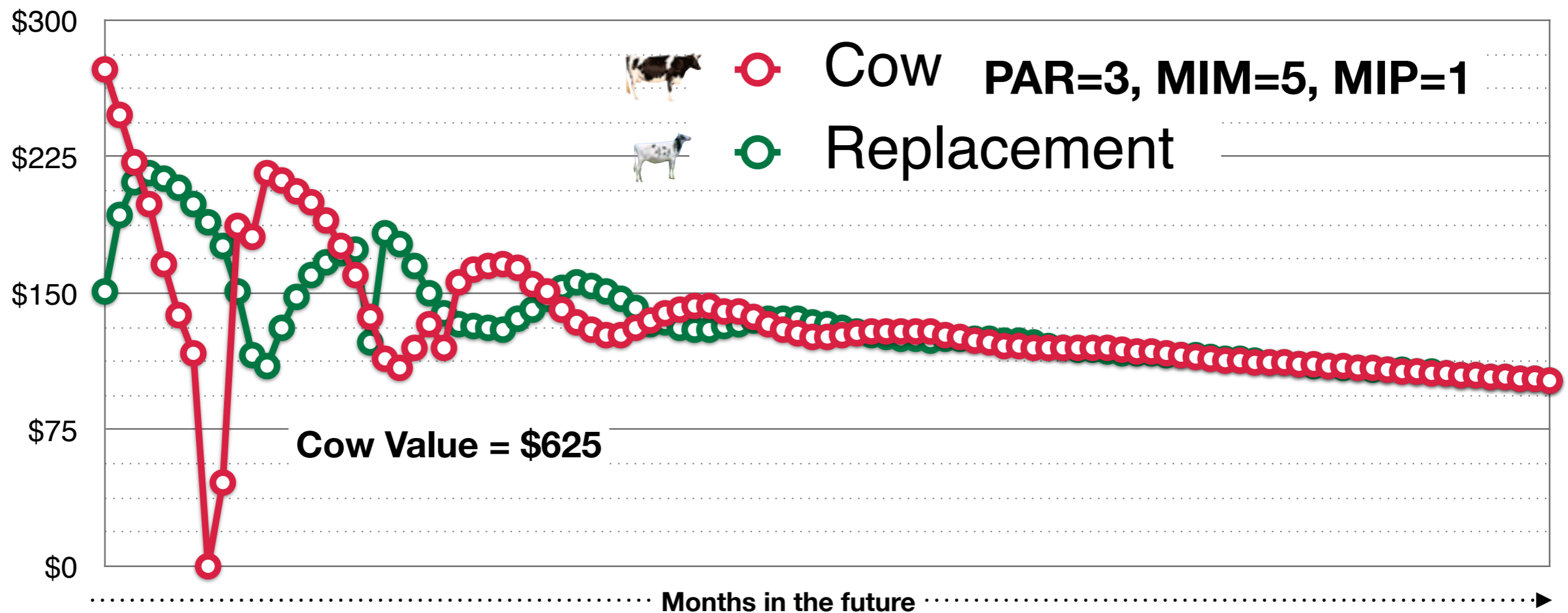
Projected net return

Discounted future net return

Always compared to a replacement

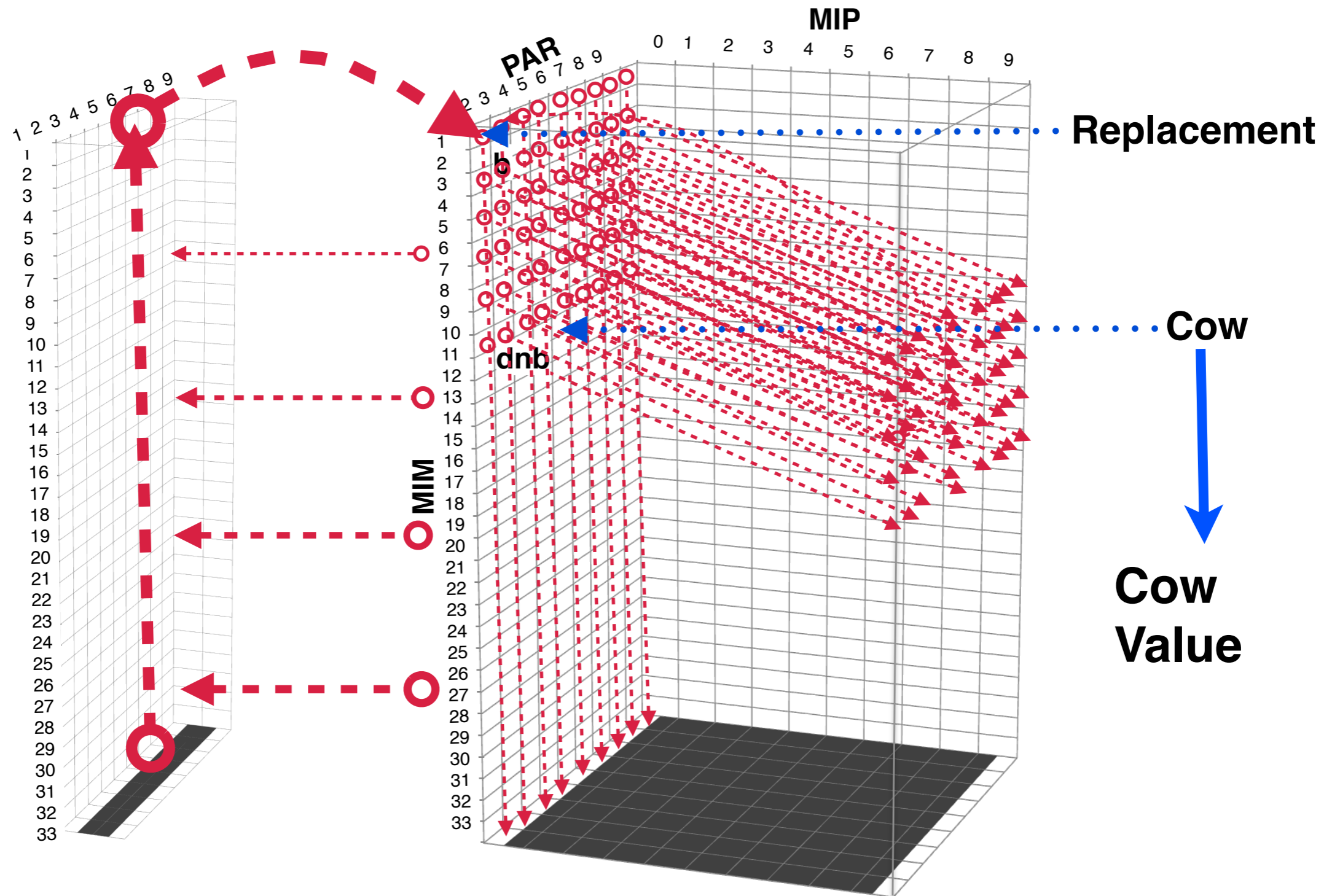
Includes transaction replacement cost

Salvage value - Springer cost



Basic principals of calculation

Markov-chains

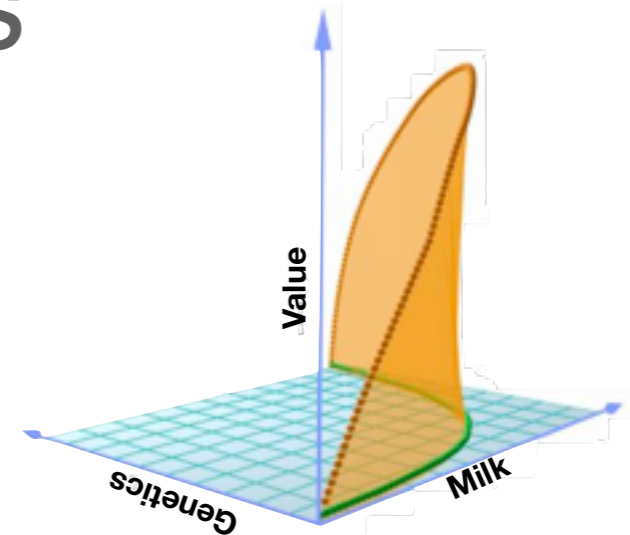


Importance of the cow value

Critical economic implications

Optimal management of herd

Keep or Replace



Important information

Value of a pregnancy

Cost of a pregnancy loss

Cost of a day open

Crucial decisions

Treat or not treat

Breed or not breed

The economic value of a dairy cow

Online decision support tool



The Economic Value of a Dairy Cow

Victor E. Cabrera, Department of Dairy Science



Overview | **Single Cow Analysis** | Herd Analysis | Units: US English US Metric UK | [Español](#)

INPUTS - Edit Values in This Block

Evaluated Cow Variables

Current Lactation	<input type="text" value="2"/>
Current Months after Calving	<input type="text" value="1"/>
Current Months in Pregnancy	<input type="text" value="0"/>
Expected Milk Production Rest of Lactation, %	<input type="text" value="100"/>
Expected Milk Production Next Lactations, %	<input type="text" value="100"/>

Replacement Cow Variable

Expected genetic improvement, % additional milk	<input type="text" value="0"/>
---	--------------------------------

Herd Production and Reproduction Variables

Herd Turnover Ratio, %/year	<input type="text" value="35"/>
Rolling Herd Average, lb/cow per year	<input type="text" value="24,000"/>
21-d Pregnancy Rate, %	<input type="text" value="18"/>
Reproduction Cost, \$/cow per month	<input type="text" value="20"/>
Last Month After Calving to Breed a Cow	<input type="text" value="10"/>
Do-not-Breed Cow Minimum Milk, lb/day	<input type="text" value="50"/>
Pregnancy Loss after 35 Days Pregnant, %	<input type="text" value="22.6"/>
Average Cow Body Weight, lb	<input type="text" value="1306"/>

Herd Economic Variables

Replacement Cost, \$/cow	<input type="text" value="1300"/>
Salvage Value, \$/lb live weight	<input type="text" value="0.38"/>
Calf Value, \$/calf	<input type="text" value="100"/>
Milk Price, \$/cwt	<input type="text" value="15.88"/>
Milk Butterfat, %	<input type="text" value="3.5"/>
Feed Cost Lactating Cows, \$/lb dry matter	<input type="text" value="0.1"/>
Feed Cost Dry Cows, \$/lb dry matter	<input type="text" value="0.08"/>
Interest Rate, %/year	<input type="text" value="6"/>

OUTPUTS - Interactive Results

Value of the Cow, \$ 897

Compared Against a Replacement, \$

Milk Sales, \$	<input type="text" value="535"/>
Feed Cost, \$	<input type="text" value="-238"/>
Calf Value, \$	<input type="text" value="-2"/>
Non-reproductive Cull, \$	<input type="text" value="-85"/>
Mortality Cost, \$	<input type="text" value="-16"/>
Reproductive Cull, \$	<input type="text" value="4"/>
Reproduction Costs, \$	<input type="text" value="-5"/>
Replacement Transaction, \$	<input type="text" value="704"/>

Herd Structure at Steady State

Days in milk	<input type="text" value="224"/>
Days to Conception	<input type="text" value="122"/>
Percent of Pregnant	<input type="text" value="52"/>
Reproductive Culling, %	<input type="text" value="8"/>
Mortality, %	<input type="text" value="3"/>
1st Lactation, %	<input type="text" value="43"/>
2nd Lactation, %	<input type="text" value="27"/>
>= 3rd Lactation, %	<input type="text" value="30"/>

Economics of an Average Cow, \$/year

Net Return, \$	<input type="text" value="1969"/>
Milk Sales, \$	<input type="text" value="3806"/>
Feed Cost, \$	<input type="text" value="-1522"/>
Calf Sales, \$	<input type="text" value="60"/>
Non-Reprod. Culling Cost, \$	<input type="text" value="-198"/>
Mortality Cost, \$	<input type="text" value="-38"/>
Reproductive Culling Cost, \$	<input type="text" value="-59"/>
Reproductive Cost, \$	<input type="text" value="-80"/>

Example:
 Value of this 2nd lactation, 1 MIM, open cow is **\$897**

Video demonstration

Available at DairyMGT.info

Economic Value of a Dairy Cow



Single cow analysis

Decision for specific cow

Most Important Factors

Other Factors

INPUTS - Edit Values in This Block

Evaluated Cow Variables

Current Lactation	3
Current Months after Calving	5
Current Months in Pregnancy	1
Expected Milk Production Rest of Lactation, %	100
Expected Milk Production Next Lactations, %	100

Replacement Cow Variable

Expected genetic improvement, % additional milk	0
---	---

Herd Production and Reproduction Variables

Herd Turnover Ratio, %/year	35
Rolling Herd Average, lb/cow per year	24,000
21-d Pregnancy Rate, %	18
Reproduction Cost, \$/cow per month	20
Last Month After Calving to Breed a Cow	10
Do-not-Breed Cow Minimum Milk, lb/day	50
Pregnancy Loss after 35 Days Pregnant, %	22.6
Average Cow Body Weight, lb	1306

Herd Economic Variables

Replacement Cost, \$/cow	1300
Salvage Value, \$/lb live weight	0.38
Calf Value, \$/calf	100
Milk Price, \$/cwt	16
Milk Butterfat, %	3.5
Feed Cost Lactating Cows, \$/lb dry matter	0.1
Feed Cost Dry Cows, \$/lb dry matter	0.08
Interest Rate, %/year	6

Analyze

OUTPUTS - Interactive Results

Value of the Cow, \$ 628

Compared Against a Replacement, \$

Milk Sales, \$	148
Feed Cost, \$	-157
Calf Value, \$	26
Non-reproductive Cull, \$	-126
Mortality Cost, \$	-24
Reproductive Cull, \$	12
Reproduction Costs, \$	45
Replacement Transaction, \$	704

Herd Structure at Steady State

Days in milk	224
Days to Conception	122
Percent of Pregnant	52
Reproductive Culling, %	8
Mortality, %	3
1st Lactation, %	43
2nd Lactation, %	27
> 3rd Lactation, %	30

Economics of an Average Cow, \$/year

Net Return, \$	1998
Milk Sales, \$	3834
Feed Cost, \$	-1522
Calf Sales, \$	60
Non-Reprod. Culling Cost, \$	-198
Mortality Cost, \$	-38
Reproductive Culling Cost, \$	-59
Reproductive Cost, \$	-80

Dollar Value

Breakdown Value of the Cow

Part II

Herd analysis

Decisions at the herd level

List of all cows in a herd

Same factors as individual cow

INPUTS - Edit Values in This Block

Download Parameter Excel File
Download Parameters File

Upload Parameters as Excel File
Select the Excel File:
Choose File HerdValued

Replacement Cow Variable
Expected genetic improvement, % additional milk

Herd Production and Reproduction Variables
Herd Turnover Ratio, %/year
Rolling Herd Average, lb/cow per year
21-d Pregnancy Rate, %
Reproduction Cost, \$/cow per month
Last Month After Calving to Breed a Cow
Do-not-Breed Cow Minimum Milk, lb/day
Pregnancy Loss after 35 Days Pregnant, %
Average Cow Body Weight, lb

Herd Economic Variables
Replacement Cost, \$/cow
Salvage Value, \$/lb live weight
Calf Value, \$/calf
Milk Price, \$/cwt
Milk Butterfat, %
Feed Cost Lactating Cows, \$/lb dry matter
Feed Cost Dry Cows, \$/lb dry matter
Interest Rate, %/year

Analyze

OUTPUTS - Interactive Results

Number of Cows: **1595**
Creating Excel Spreadsheet ...

Progress bar

CowID	Cow Value,\$	CowID	Cow Value,\$
3747	-5685	4846	-2687
6752	-5086	4540	-2649
4370	-4686	3838	-2614
6141	-4119	6402	-2602
5666	-4094	6050	-2579
5331	-3999	6736	-2579
6963	-3941	4174	-2572
6552	-3651	4236	-2550
4763	-3517	6918	-2525
6362	-3488	6472	-2505
4799	-3440	5508	-2488
4104	-3297	5681	-2484
5208	-3233	5940	-2440
6867	-3180	6721	-2436
4906	-3090	6633	-2430
6122	-3064	5790	-2423
6224	-3041	6801	-2420
6928	-3028	6857	-2420
6748	-2973	6820	-2388
6666	-2908	4586	-2333
3892	-2899	4264	-2323
4192	-2776	5766	-2282
3727	-2724	6303	-2282
4639	-2700	6975	-2282
4876	-2693

Download Results as Excel Spreadsheet

Count of cows

Results snapshot

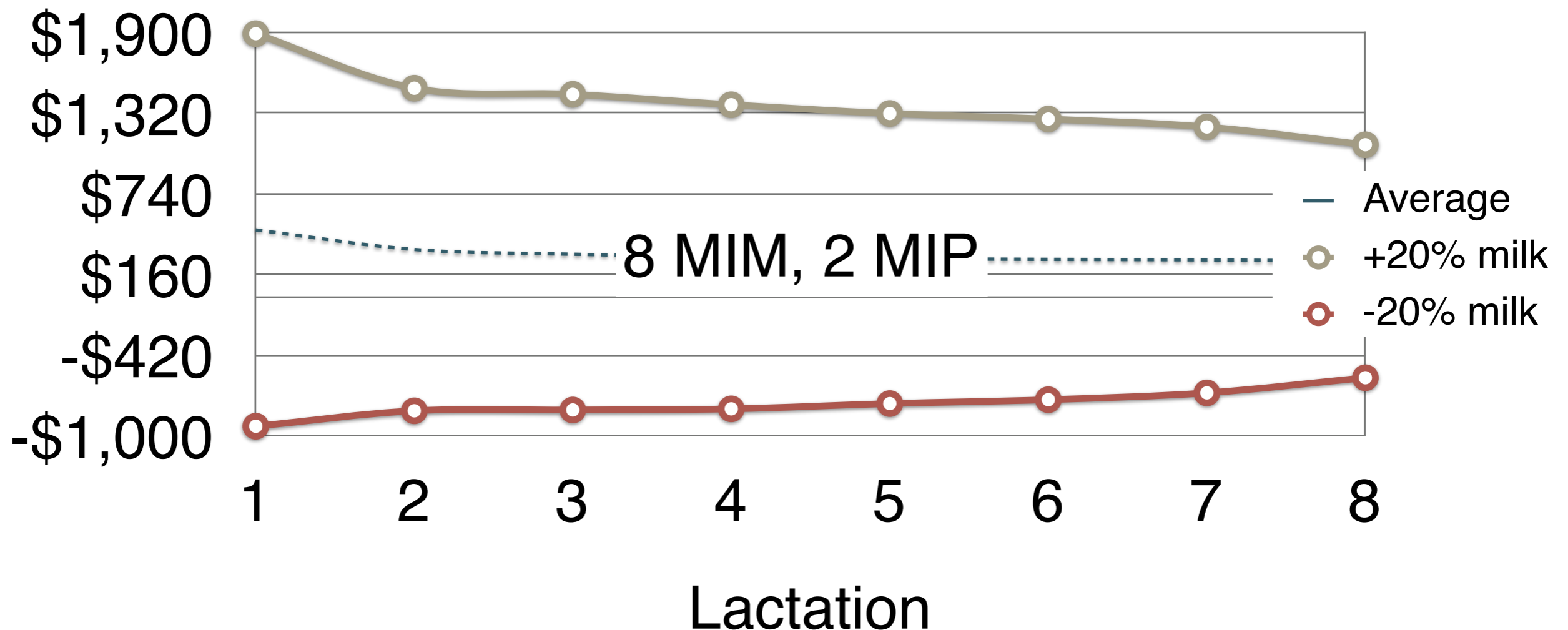
Analyze results

Economic value of a dairy cow

Practical decision-making

Cull or not cull

Positive cow value indicates cow brings more value than replacement

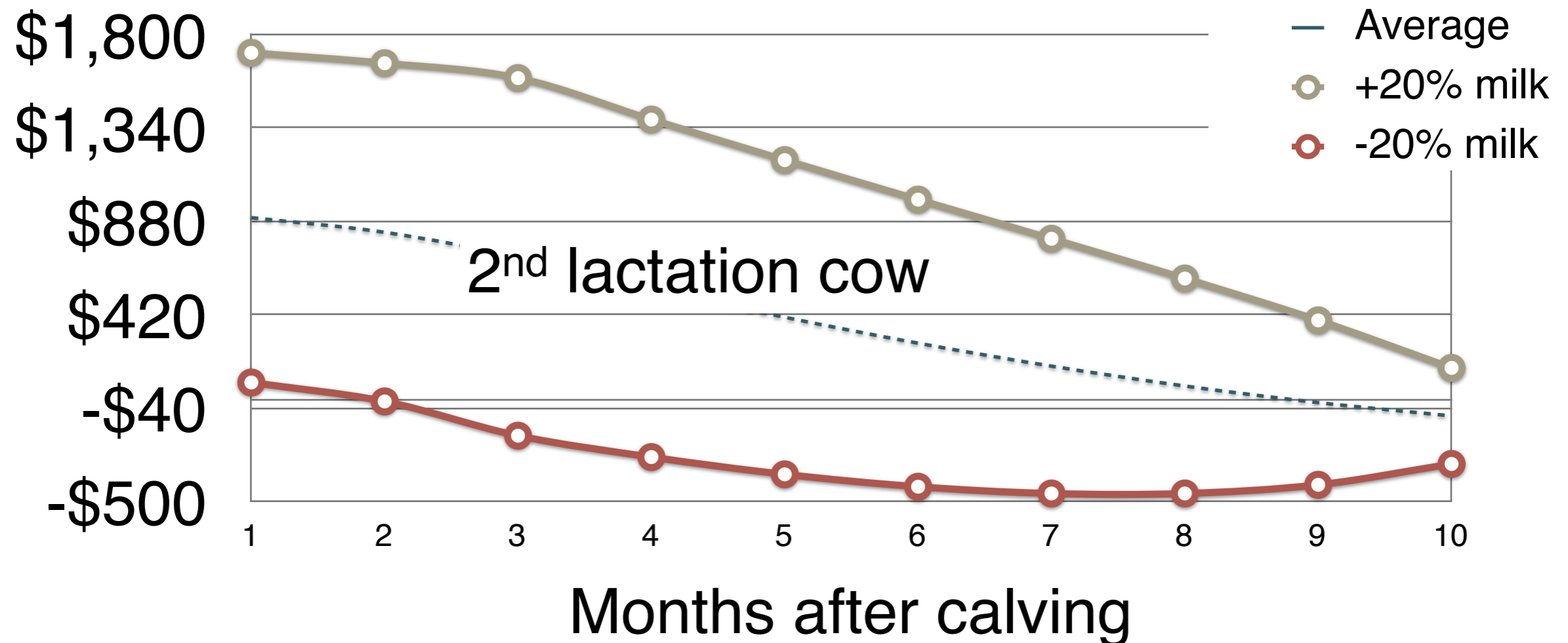


Economic value of a dairy cow

Practical decision-making

Breed or not breed

Better chance for higher value cows

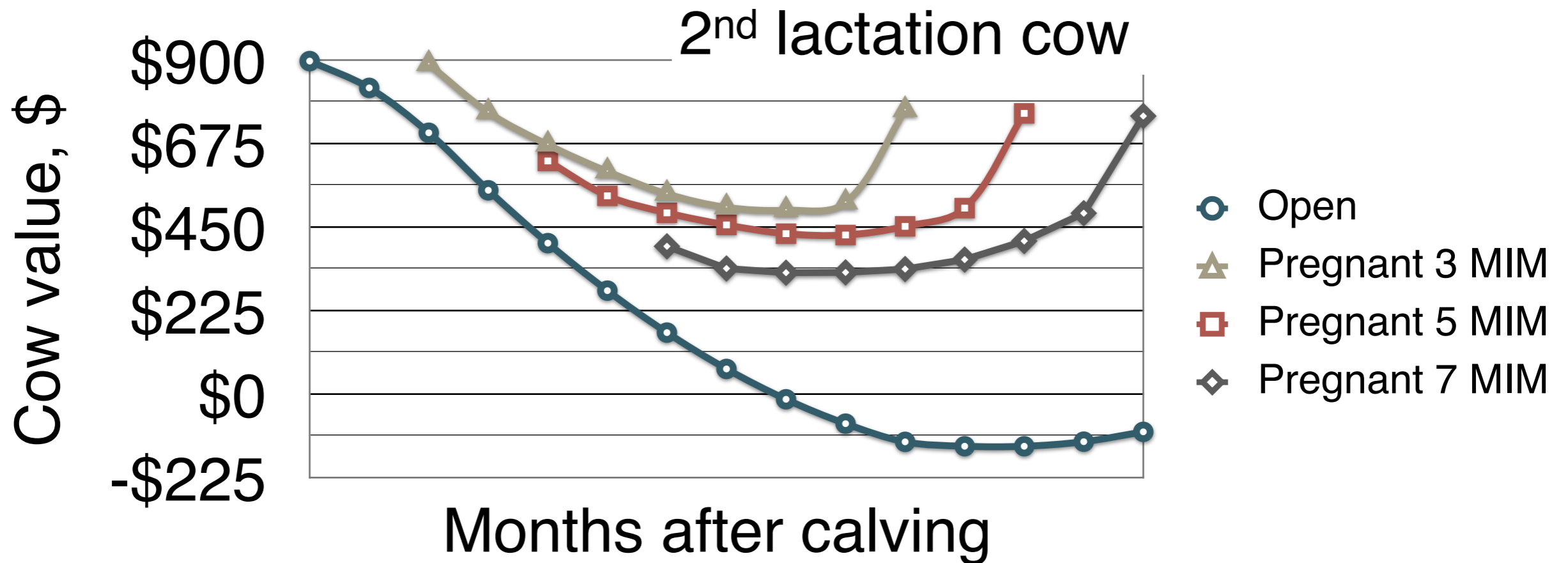


Economic value of a dairy cow

Practical decision-making

Treat or not treat

More investment allowed
in higher value cows

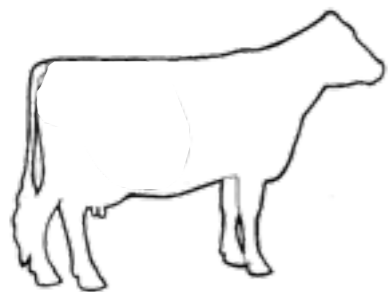


Economic value of a dairy cow

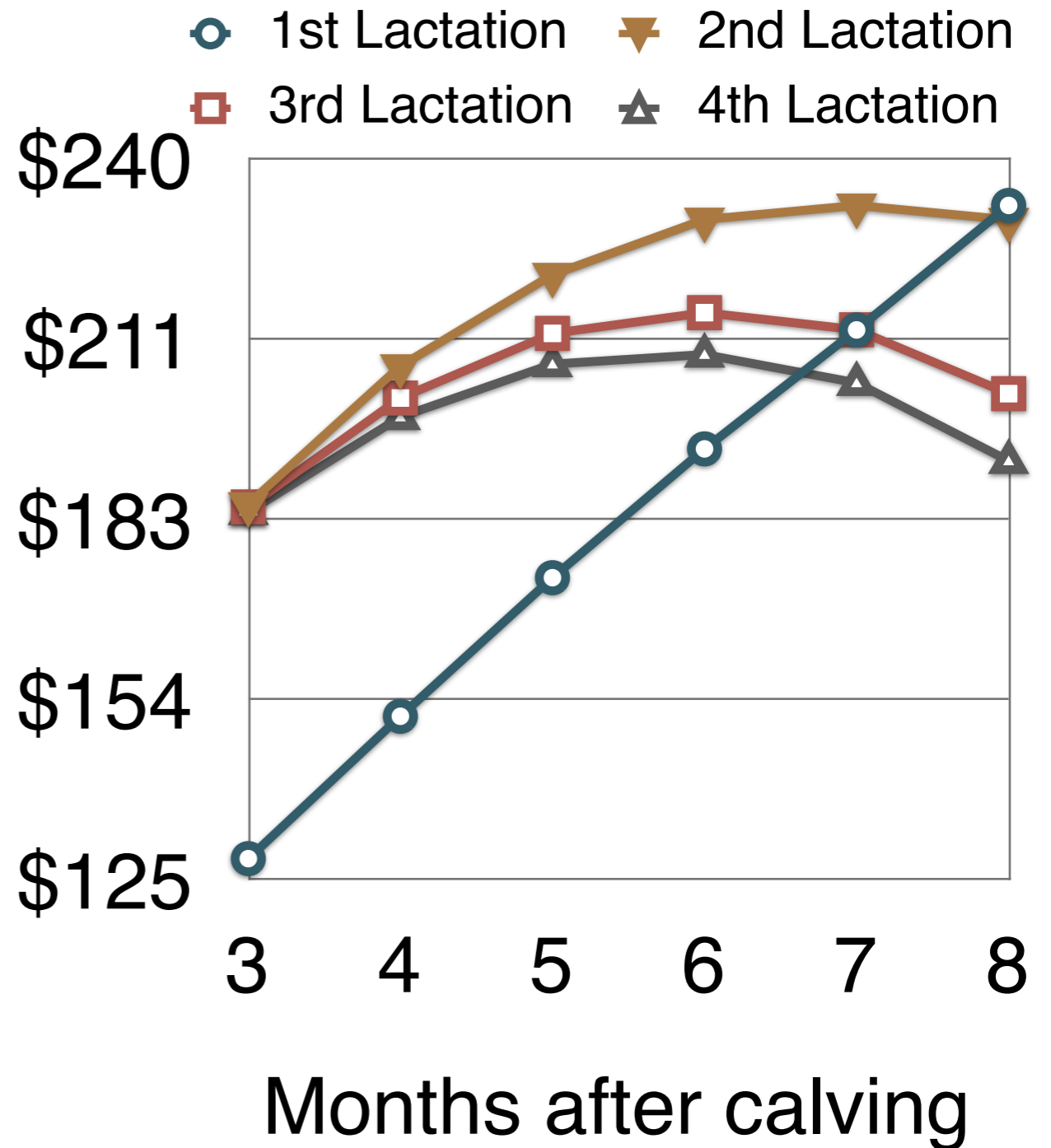
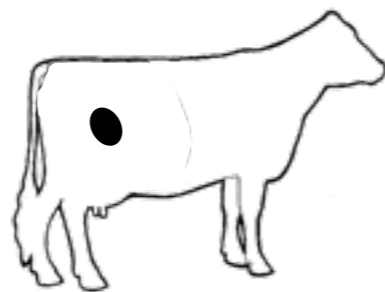
Practical decision-making

Calculate the value of a pregnancy

Difference between pregnant and non-pregnant



vs.

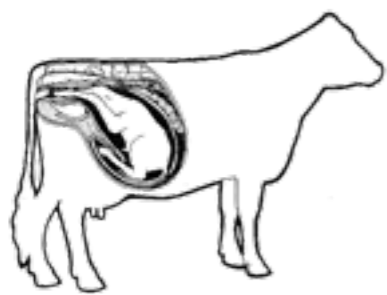


Economic value of a dairy cow

Practical decision-making

Calculate the cost of a pregnancy loss

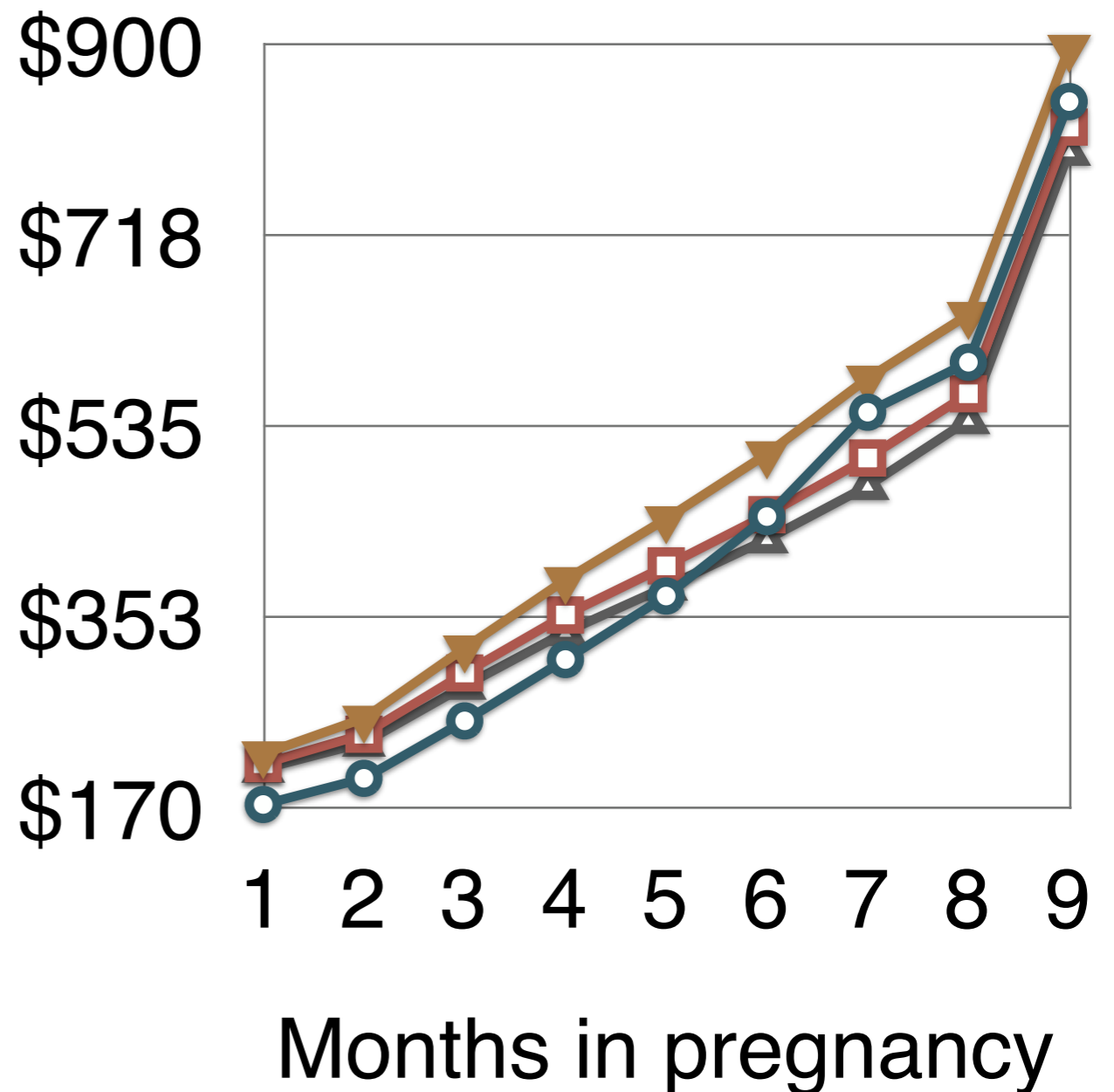
Difference between non-pregnant and pregnant



vs.



- 1st Lactation
- 2nd Lactation
- 3rd Lactation
- 4th Lactation

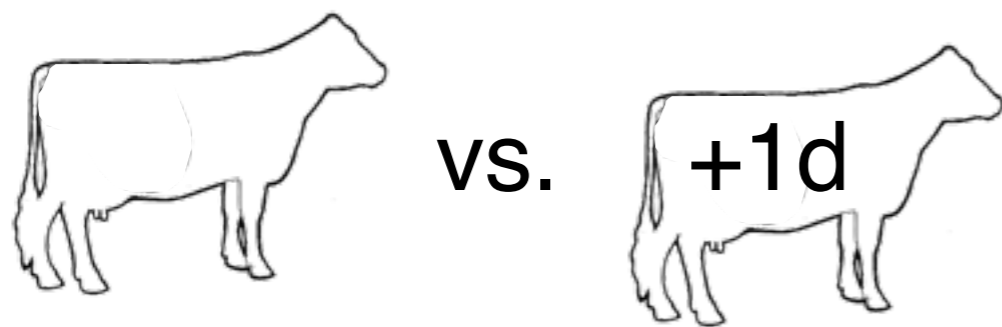


Economic value of a dairy cow

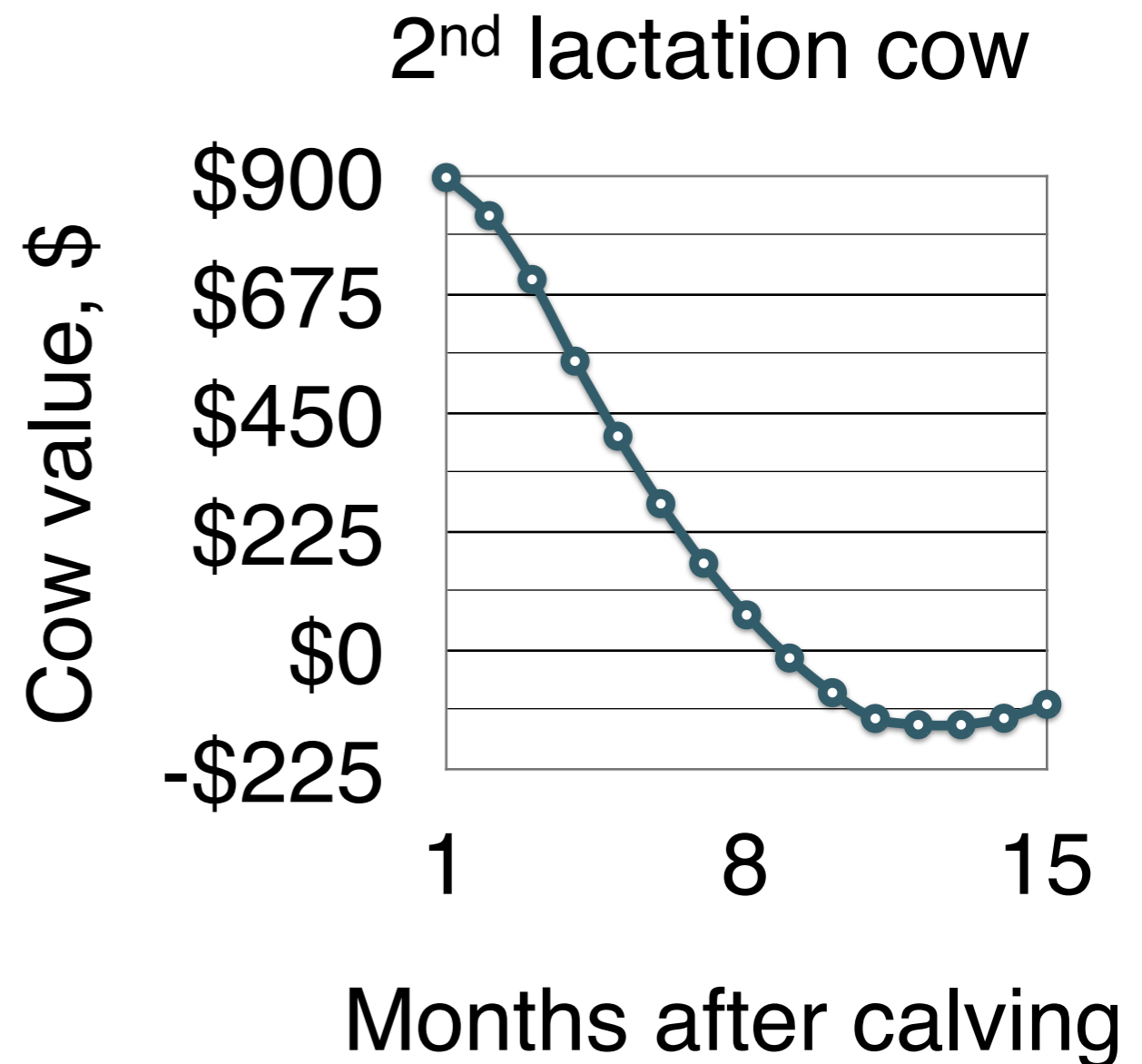
Practical decision-making

Calculate the cost of a day open

Difference between value of non-pregnant cow in 2 successive days



E.g., \$5.16 (month 2-3)
and \$4.26 (month 5-6)



Herd Selection Guide



AgSource

Breeding and replacement decisions

Current Lactation			Lifetime Average			Genetics		Test Day		Exp. Rel. \$
ME Milk	LS SCC	TCI	ME Milk	LS SCC	TCI	NM\$	Gen Ind.	Milk	LS SCC	
46513	1.1		46513	1.1		99				\$4,576
43440	0.8		43440			142		78	0.9	\$3,684
42577	1.9		42577			146		131	1.3	\$3,571
42690	1.4		42690			567		109	0.9	\$3,468
41259	1.6		41259			340		112	1.5	\$3,156
42777	2.4		42777			20		125	2.2	\$3,130
39417	5.4	2404	39616	0.5	2404	318		128	3.9	\$278
33255	0.9	428	35944	4.6	428	71		131	1.2	\$276
33183	1	-913	34185	1.7	-76	344				\$273
31578	1.4	3517	34188	3.8	3517	285		119	1.4	\$273
34011	3.8		34011	3.8						\$270
33609	1.6		33609			185		59	1.9	\$269
27406	0.8	612	36670	1.9	226	194		115	1	\$265
33556	0.9		33556			124		100	0.8	\$256
17783	1.2	-6148	26926	3.3	-6148			47	1.1	(\$3,473)
23564	2.1		23564					53	2.1	(\$3,654)
19546	1.7		19546					34	1.7	(\$5,128)
19173	1.6		19173					41	0.8	(\$5,151)
18936	1.6		18936					41	1.6	(\$5,384)
17321	1.3		17321					34	1.3	(\$5,958)

New report being offered to ≥ 3,500 dairy farmers in Wisconsin

Economic values of cows calculated with tool

Examples

Fast answers to complicated questions

MIM to replace open cow?

- 1st Lactation:
- 2nd Lactation:
- 3rd+ Lactation:



Cost of open day?

- 3rd lactation, 4 to 5 MIM:

Invest \$200 in mastitis treatment?

- 2nd lactation, 7MIM, 3 MIP:
- Producing <15% milk this lactation:





Thanks