



Improving cost-efficiency and profitability

Fertility associated economic losses of farms

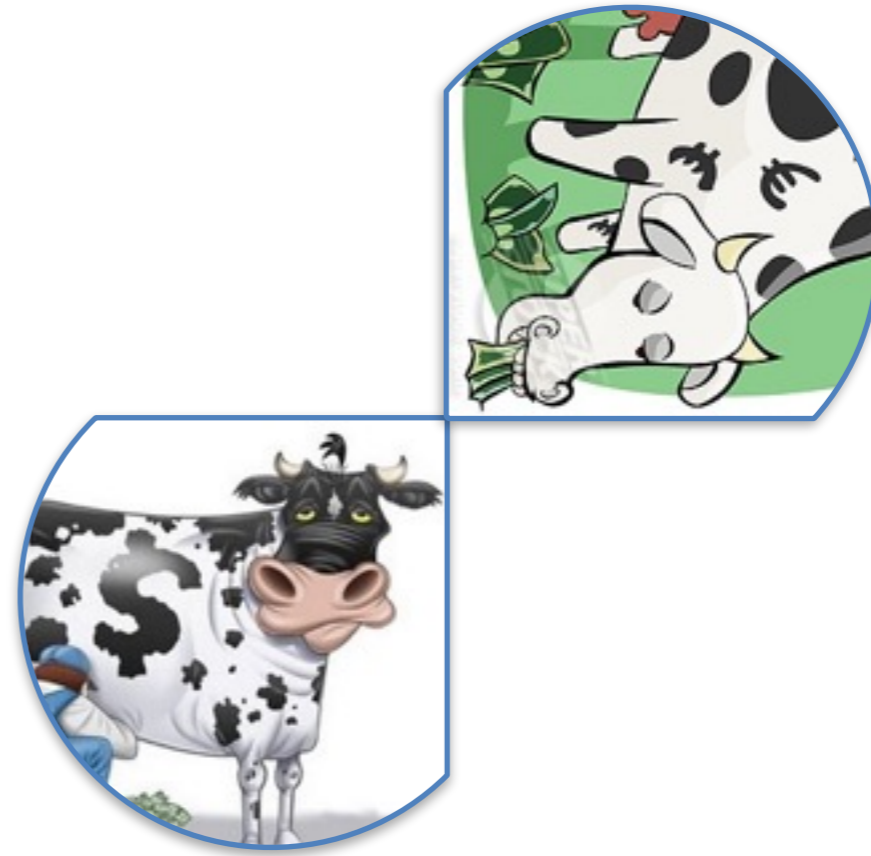


UW-Dairy Management
Decision Support TOOLS

Victor E. Cabrera

Implications

- ↑ Reproductive performance
- ↑ **Profitability**



Required:
Economic value
quantification

Market conditions:
Change constantly

Farm are different:
Farm specific
assessments

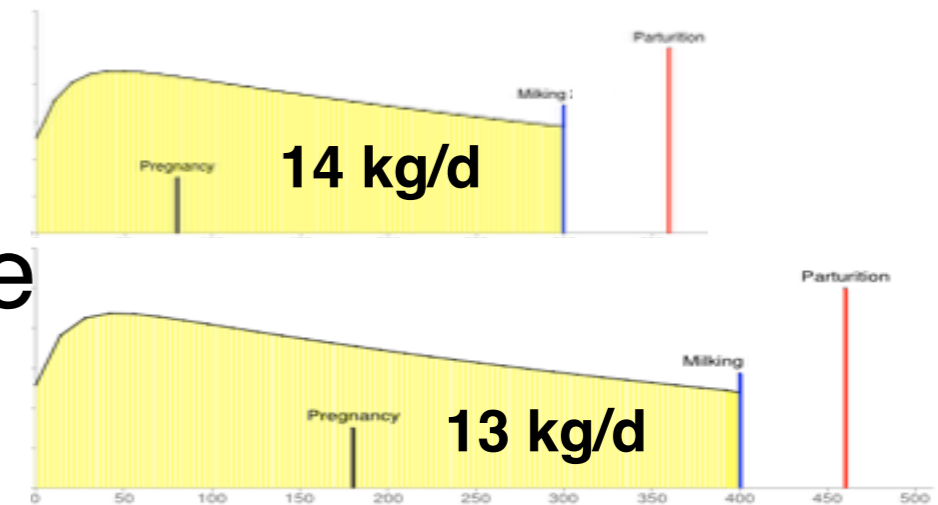
Large economic impact

Economic net return: Strongly associated to reproductive performance

↑ Reproductive performance:

Most efficient part of lactation curve

Ferguson and Galligan, 1999



↓ Costs replacement and mortality

Galvao et al., 2013

↑ On-farm replacements

Giordano et al., 2012

↓ Relative reproductive costs

Giordano et al., 2012

21-d Pregnancy Rate: Best single index of reproductive performance (not perfect...)

Ferguson and Galligan, 1999

Measure

Standardize

Benchmark

Rate at which eligible cows become pregnant in successive 21-d periods

Integrates many other parameters that indicate reproductive performance

Managers of modern US commercial dairy herds use 21-d PR **adjusted to 50 d VWP**



What happens with the 21-d PR if VWP is arbitrarily changed from 50 d to 70 d?

A. Increases

C. Remains

B. Decreases

D. It depends

Economic impact of reproductive programs: Difficult to assess - integrated

Series of recent simulation studies: Provide interesting clues and further direction

Giordano et al., 2011:
Partial budgeting, DSS

Giordano et al., 2012: Daily Markov chains, DSS

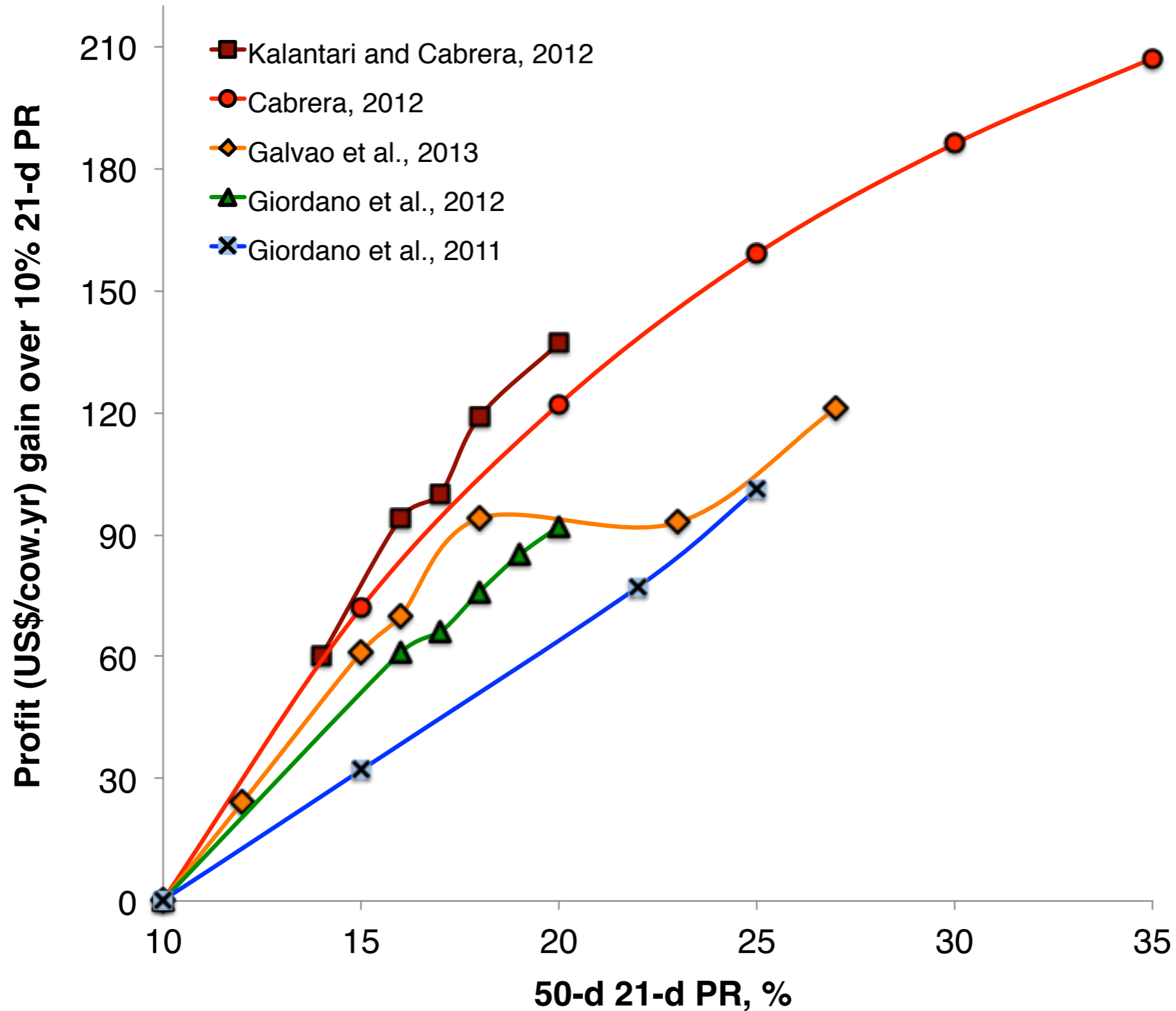
Cabrera, 2012: Markov-Chain, DSS

Kalantari and Cabrera, 2012: Markov-Chain, DSS

Giordano et al., 2013:
Decision theory

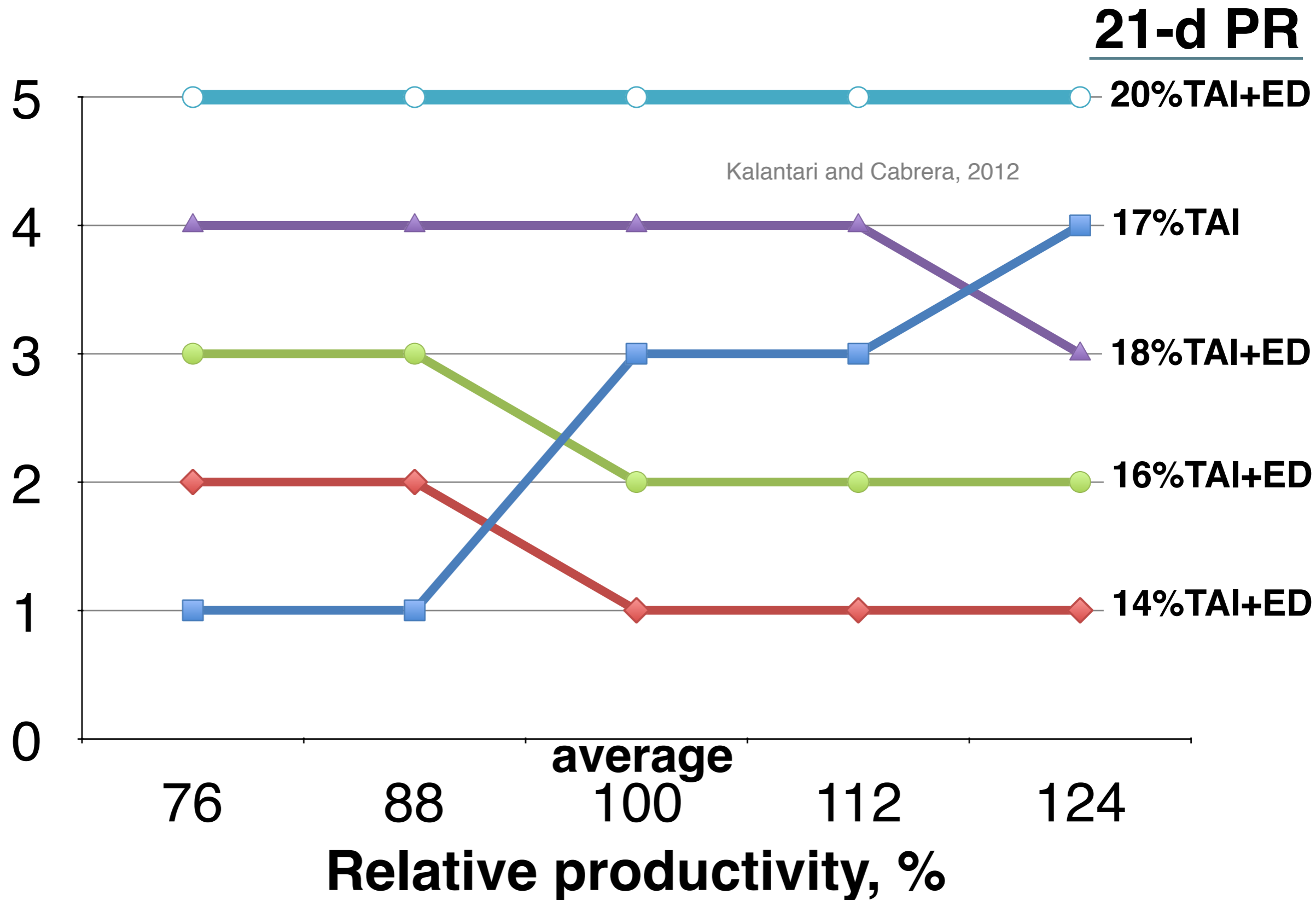
Galvao et al., 2013:
Monte Carlo

The economic value of improving reproductive performance



Herd's relative milk productivity

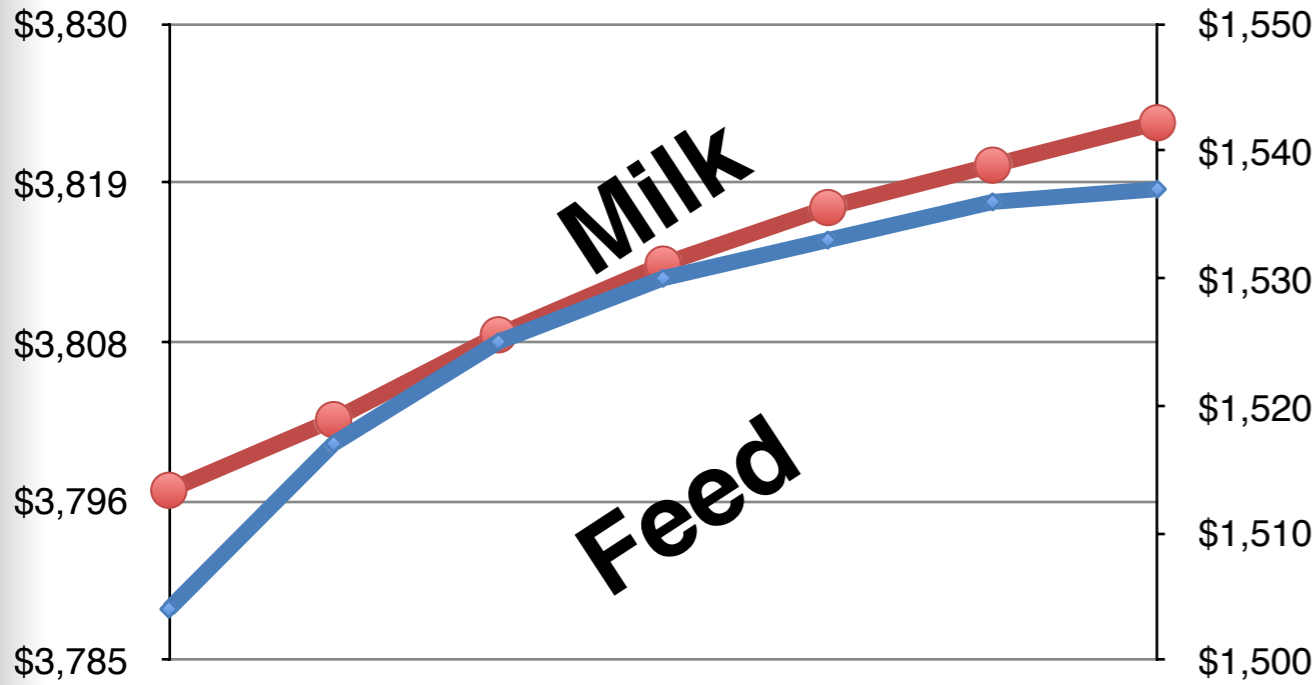
Ranking net return
1=worst, 5=best



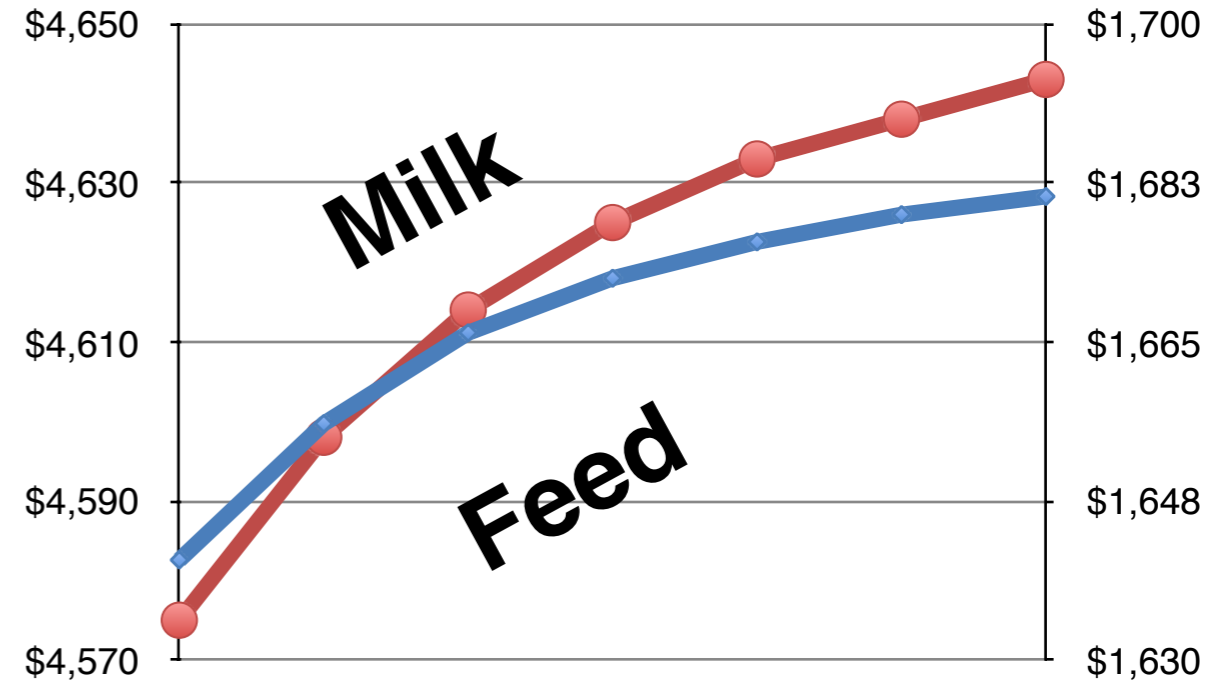
TAI=Timed Artificial Insemination

ED=Estrus Detection

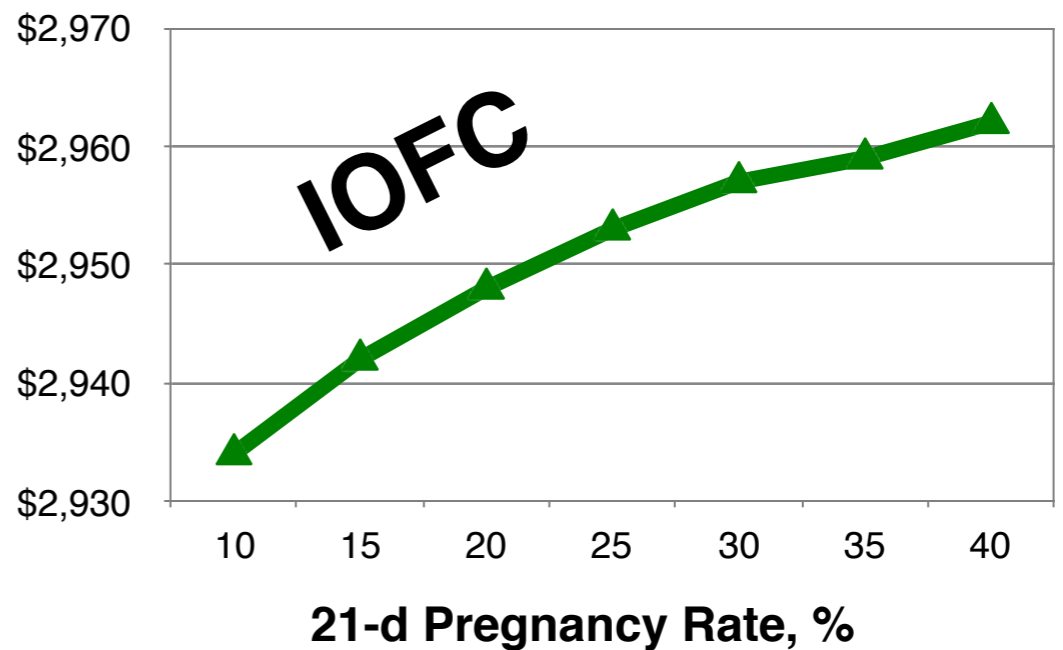
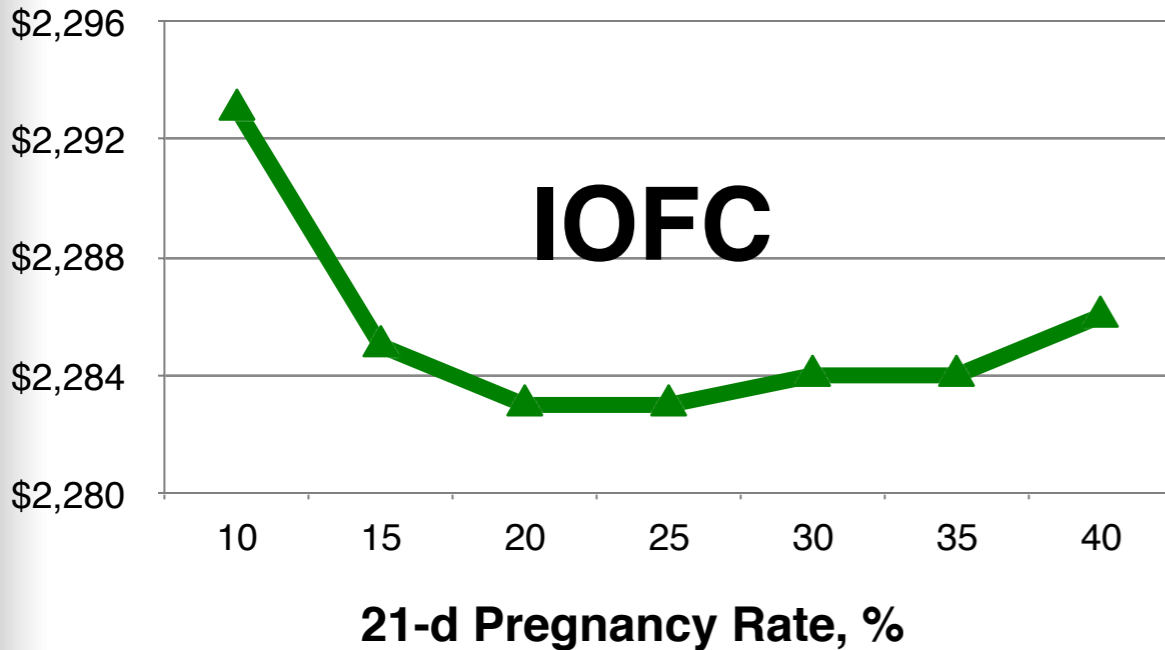
Milk, feed, and IOFC (\$/cow.yr)



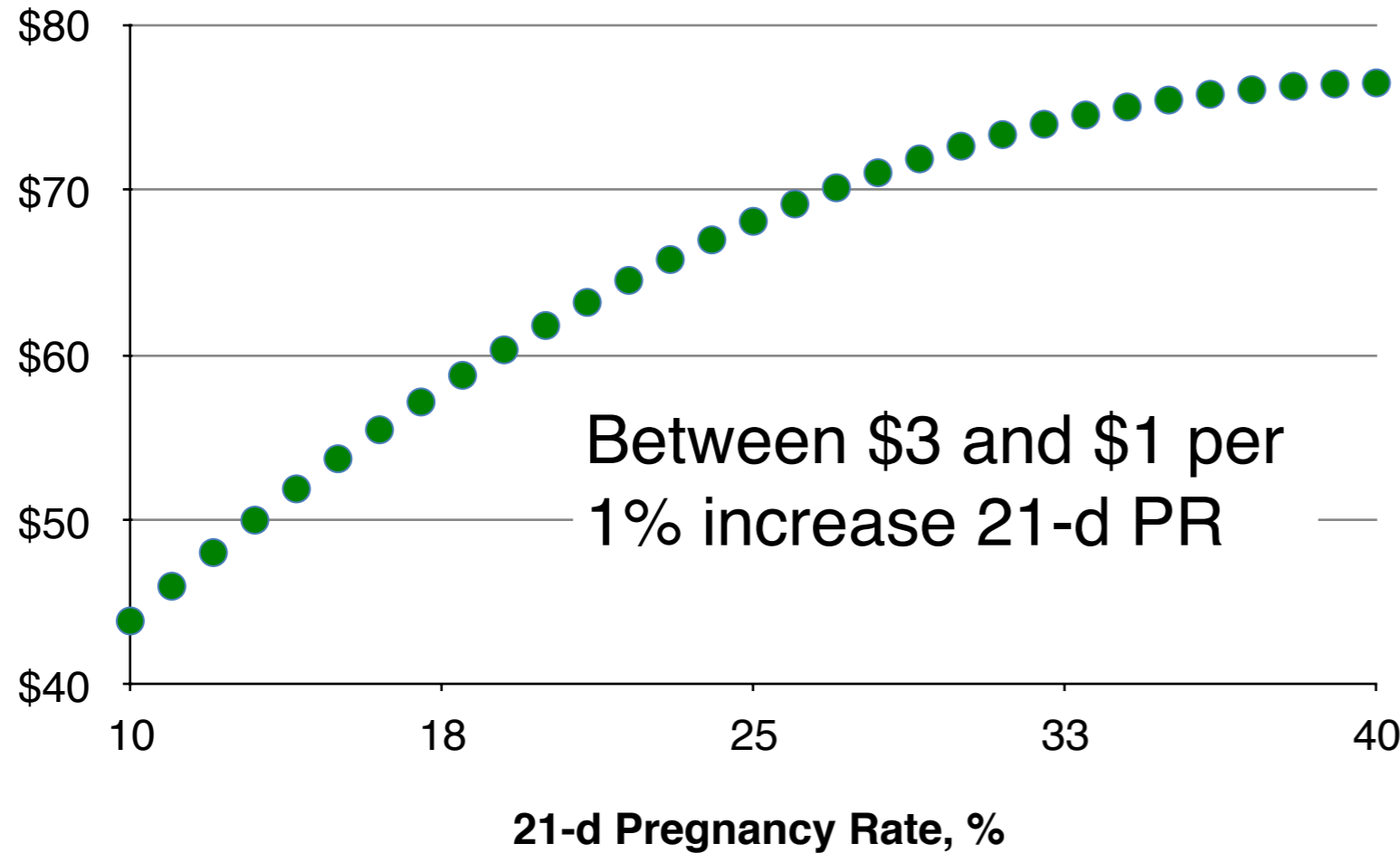
11,000 kg/cow.yr



13,600 kg/cow.yr



Calf sales (\$/cow.yr)



Return (\$/cow.yr) =

$$- 0.0352 (21\text{-d PR})^2$$

$$+ 2.8476 (21\text{-d PR})$$

$$+ 18.93 \quad (R^2=0.996)$$

♂
♀ Calf value = \$100

Cabrera, 2012

Study	♂ ♀ Calf value, \$	Gain, \$/1% 21-d PR
<i>Galvao et al., 2013</i>	\$140	\$1 to \$3
<i>Giordano et al., 2012</i>	\$90	\$2 to \$1

Replacement supply

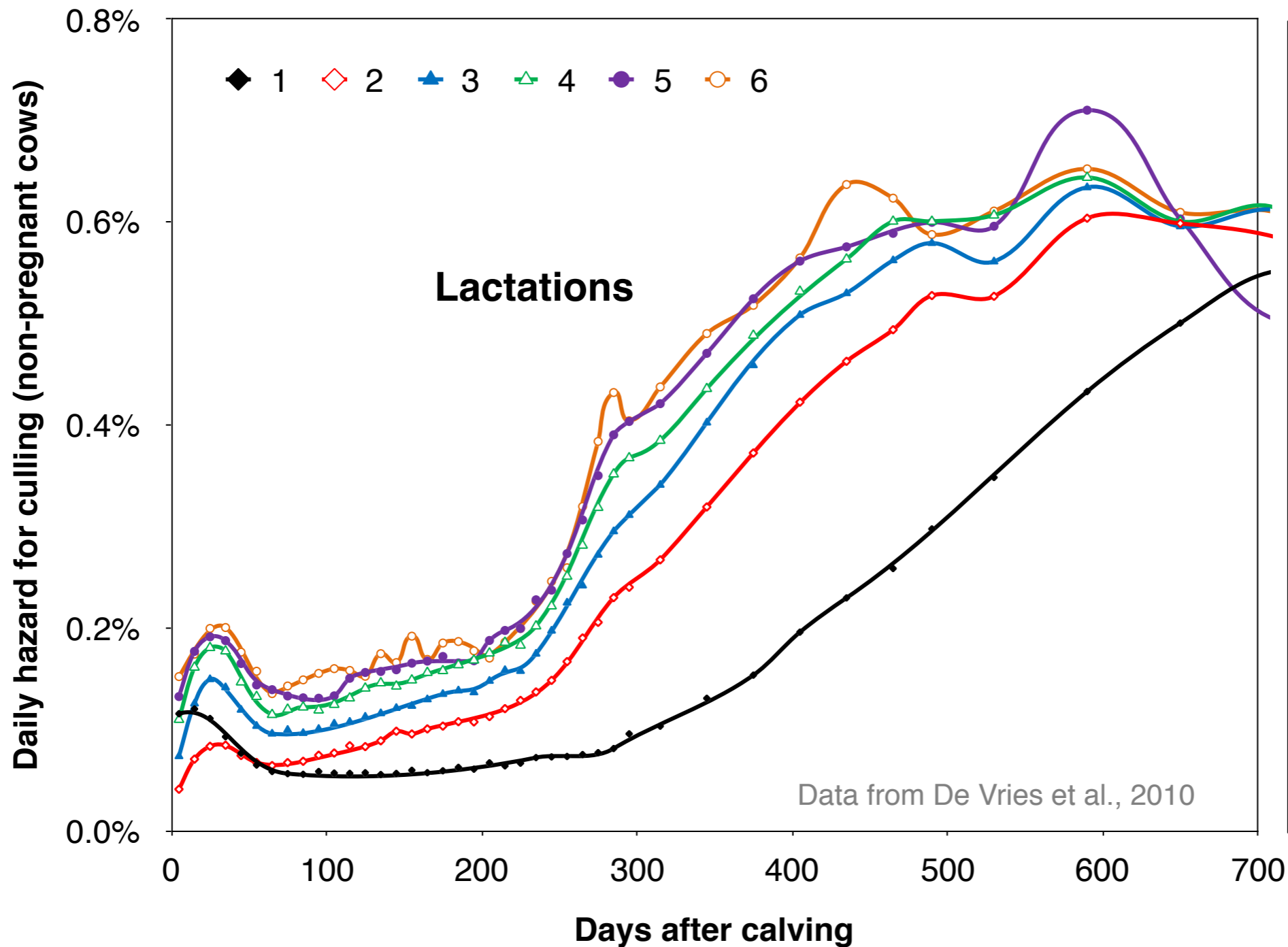
↑21-d PR → ↑ Selective culling

Souza et al., 2013

21d-PR, % (reproductive programs)	Replacement balance /1,000 cow Cutoff 300 DIM	NEW cutoff to balance, DIM	Net return change, \$/cow.yr
14	-14	310	-5
15	0	300	0
16	15	281	+5
17	20	270	+6
18	38	240	+7
19	40	240	+8
20	48	235	+9

Replacement and mortality costs

[Mortality = Proportion of culling risk (e.g., 17% of that risk)]



**Lower Costs
\$/cow.yr
↑ 1% 21-d PR**

\$4 to \$1

Cabrera, 2012

\$4 to \$3

Giordano et al., 2012

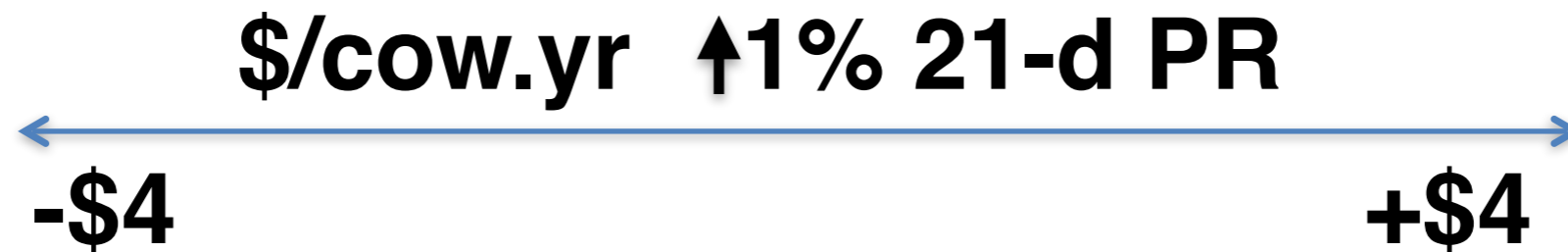
\$27 to \$4

Galvao et al., 2013

Pregnant = Less risk than non-pregnant (e.g., 75% less risk)

Reproductive costs

- \uparrow PR (no investment) \rightarrow \downarrow Reproductive costs
- \uparrow PR may require \uparrow investments
- Depends on investments vs. \uparrow PR
- Seems to be inconsistent among studies



Galvao et al., 2013

Giordano et al., 2011; 2012

Oestrus detection, synchronisation, or a combination

Most high yielding USA herds use a combination

78% OD & 87% TAI Caraviello et al., 2006

Common reproductive practice:

TAI protocol and perform inseminations at detected oestrous in between Giordano et al., 2012

Recent economic studies:

OD or TAI, but combinations studied

Giordano et al., 2011

Presynch-Ovsynch + Ovsynch with a focus on OD combination

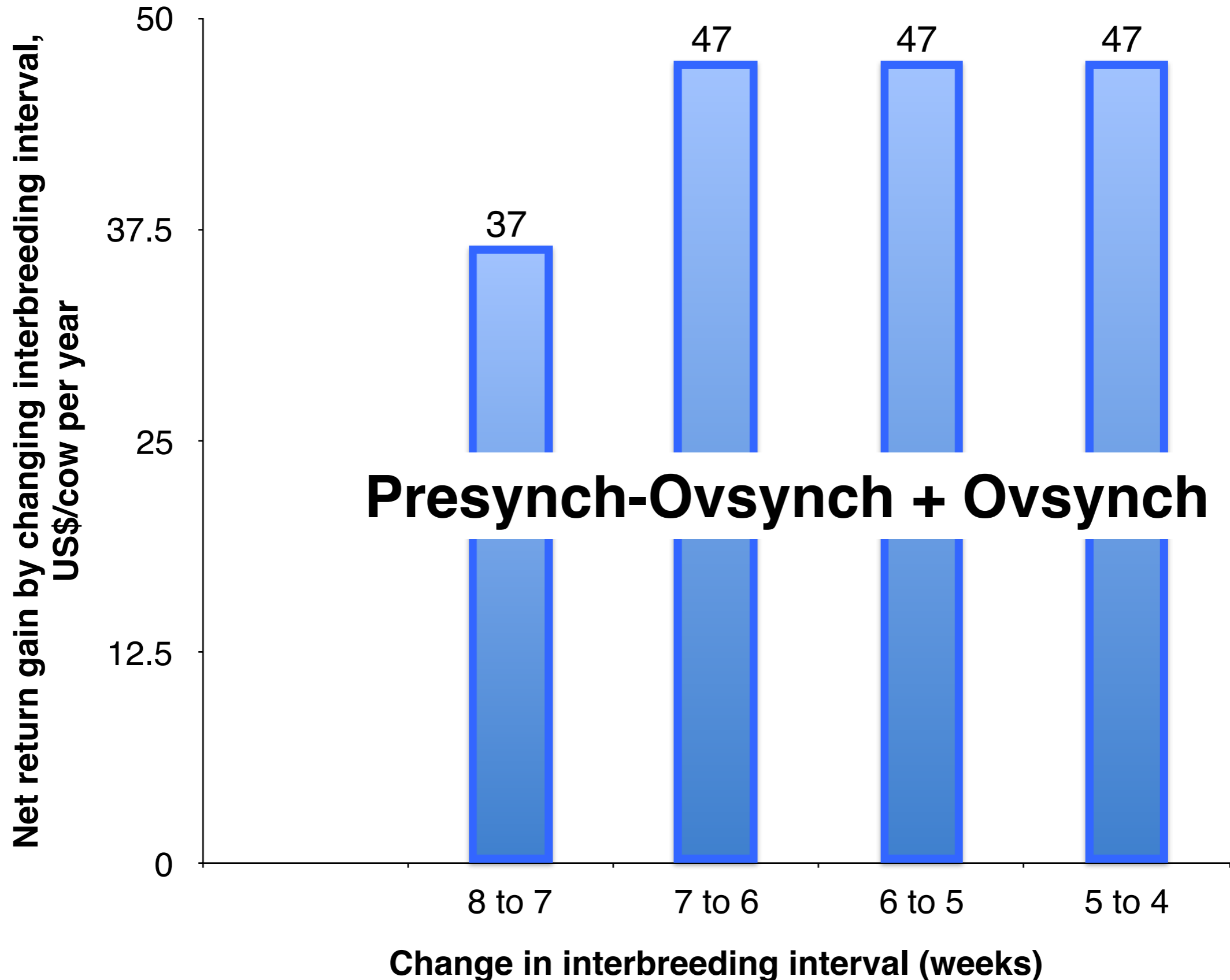
Giordano et al., 2012;

Galvao et al., 2013

Economic effect of TAI with OD

Study <i>Programme</i>	Net return gain TAI vs. TAI + OD, \$/cow.yr				
	TAI CR, %		60% OD CR, %		
	First Serv.	Later Serv.	25	30	35
Giordano et al., 2011					
<i>Double Ovsynch + D32 Ovsynch</i>	45	30		14	
<i>Double Ovsynch + Double Ovsynch</i>	45	39		-12	
Giordano et al., 2012					
<i>Presynch-Ovsynch + Ovsynch</i>	42	30	-17	2	19
Galvao et al., 2013					
<i>Presynch-Ovsynch + Ovsynch</i>	33	25	23	57	

Interbreeding interval vs. net return



Blood or milk-based pregnancy tests

Potentially effective when used earlier than conventional methods – **Shorten IBI**

Earlier pregnancy diagnosis with a chemical test could have some important drawbacks:

1. Lower accuracy

- a. False negative (issue of sensitivity)
- b. False positive (issue of specificity)
- c. Questionable diagnoses (inconclusive)

2. Larger proportion of early pregnancy losses

Accuracy of blood chemical test for early pregnancy diagnosis

Compared to conventional ultrasound or palpation

↓ **Sensitivity** → **2-3%** → **Re-synch** → **Preg. loss**

↓ **Specificity** → **2-3%** → **Longer IBI** → **Time loss**

↓ **Conclusive** → **3-9%** → **Re-test/Longer IBI**

↑ **Preg. Losses** → **6-6.6%/week** → ↓ **Specificity**

d31 Chemical vs. d39 Palpation

CT31 vs. RP39; 35 vs. 42 d IBI @ 50% OD

= -795

+535 (sensitivity %)

+305 (specificity %)

-305 (pregnancy losses %)

-39 (questionable diagnoses %)

-1.8 (cost of test \$)

	Sensitivity %	Specificity %	Pregnancy losses %	Questionable diagnoses %	Test Cost \$
<i>Baseline</i>	<i>98</i>	<i>98</i>	<i>6.0</i>	<i>3.3</i>	<i>2.4</i>
<i>Positive</i>	<i>≥96</i>	<i>≥95</i>	<i>≤9.0</i>	<i>≤27</i>	<i>≤7.5</i>

d25 Chemical vs. d32 Ultrasound

CT25 vs. TU32; 28 vs. 35 d IBI @ 50% OD

= -638

+450 (sensitivity %)

+253 (specificity %)

-253 (pregnancy losses %)

-34 (questionable diagnoses %)

-1.9 (cost of test \$)

	Sensitivity %	Specificity %	Pregnancy losses %	Questionable diagnoses %	Test Cost \$
<i>Baseline</i>	<i>97</i>	<i>97</i>	<i>6.6</i>	<i>8.5</i>	<i>2.4</i>
<i>Positive</i>	<i>≥95</i>	<i>≥94</i>	<i>≤10</i>	<i>≤34</i>	<i>≤7.0</i>



Why profitability increases as reproductive efficiency improves?

A. +Milk

C. +Replacement


B. -Culling


D. All the above

The UWCU Repro\$ Tool

Very sophisticated, still highly user-friendly

[Herd Description](#) [About & Help](#)




 **Cornell University**
Department of Animal Science

**Wisconsin-Cornell Dairy Repro\$
(UWCUREpro\$)**
Version 1.3.3.0


Developed By:
Afshin S. Kalantari, Julio O. Giordano and Victor E. Cabrera

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Acknowledgments
This project was supported by Agriculture and Food Research Initiative Competitive Grant no. 2010-85122-20612 from the USDA National Institute of Food and Agriculture.



This research was also supported by Hatch project to V.E.C. WIS01577.



Overview

Reproductive performance greatly impacts dairy farm profitability. Optimal reproductive performance improves milk productivity because cows take better advantage of the most productive part of their lactations, decreases replacement costs due to less reproductive failure, increases the number of offspring, and decreases reproductive costs per pregnancy. Normally, farmers and consultants can keep detailed records and compute meticulous reproductive costs. They can also know herd's reproductive performance. However, it is difficult to assess the actual monetary value of alternative reproductive programs. Therefore, in a multi-state collaboration, we have created the Wisconsin-Cornell Repro\$ (UW-CUREpro\$) to assist dairy farm decision-makers perform advanced reproductive analyses by studying the economic value of intended reproductive management strategies. The UW-CUREpro\$ is a complex daily Markov chain model inspired on Giordano et al., 2012 (J. Dairy Science 95:5442) that daily simulates every single cow and her economics, and computes the net return associated to reproductive performance parameters. Luckily, this tool has been designed as a user-friendly decision support tool and users only need to define: 1) productive, reproductive, and economic parameters to represent their own farm particular conditions and 2) potential reproductive strategies to be implemented. The decision support tool takes care of the rest!

[UWCUREpro\\$-Instructions.pdf](#)

DairyMGT.info



J. Dairy Sci. 95:5442–5460
<http://dx.doi.org/10.3168/jds.2011-4972>
© American Dairy Science Association®, 2012.

A daily herd Markov-chain model to study the reproductive and economic impact of reproductive programs combining timed artificial insemination and estrus detection

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Dairy Management



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This site is designed to support dairy farming decision-making focusing on model-based scientific research. The ultimate goal is to provide user-friendly computerized decision support tools to help dairy farmers improve their economic performance along with environmental stewardship.



UW-Dairy Management
Decision Support TOOLS

University of Wisconsin

- University of Wisconsin - Madison
- UW - Cooperative Extension
- UW - Dairy Science
- UW - Extension Dairy Team
- Dairy Cattle Reproduction
- Dairy Cattle Nutrition

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- [Genomic Selection and Herd Management](#)
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Contact



Associate Professor
Extension Specialist
in Dairy Management

Helpful Link

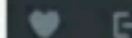
[Repro Money Program](#)

Tweets by @vecabrera



Victor E. Cabrera
@vecabrera

tristatedairy.org/agenda.htm
fb.me/7Klyz3Ta4



05 Feb

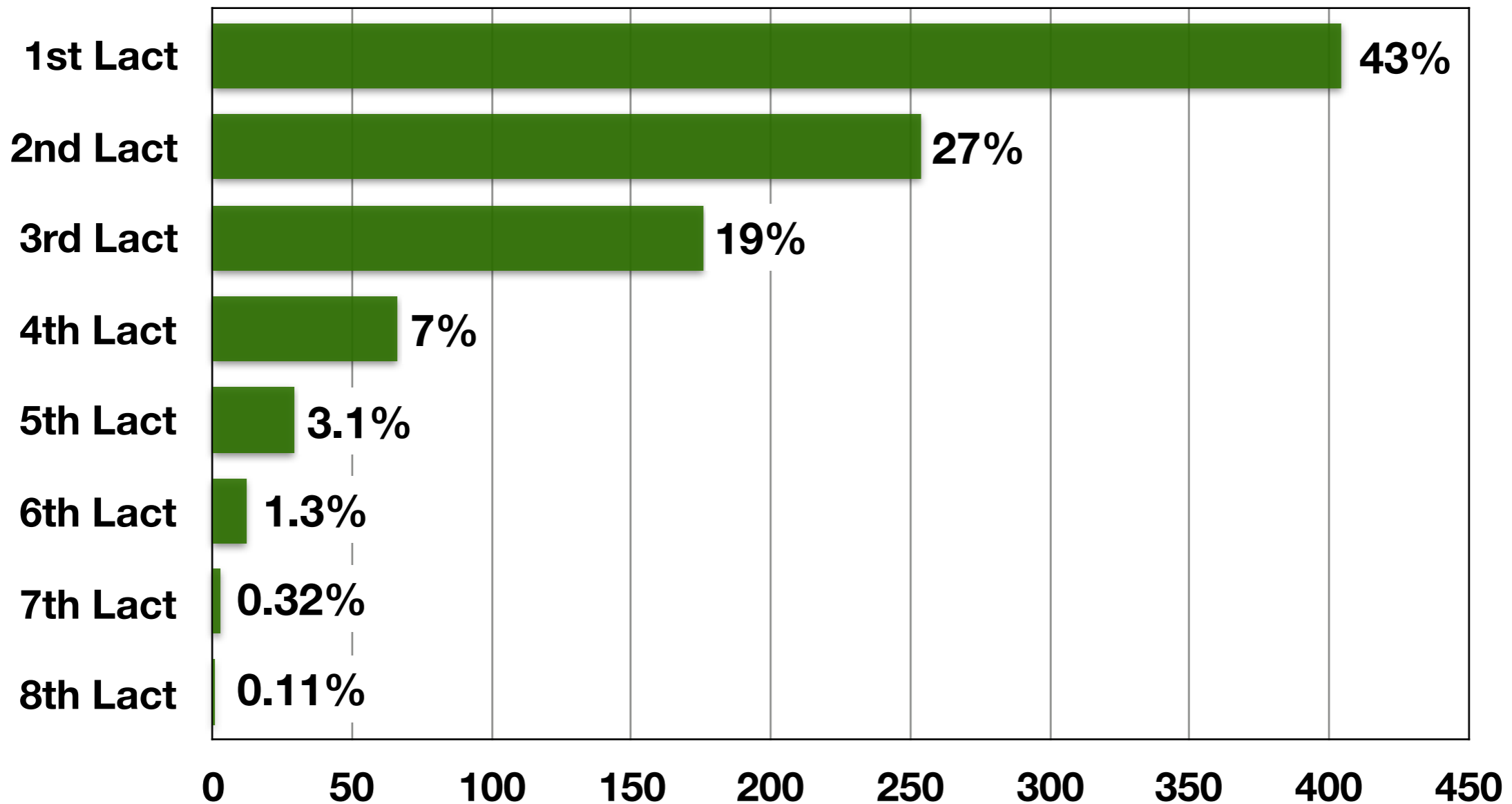
Video demo

Wisconsin Dairy Farm (Dec 2014)



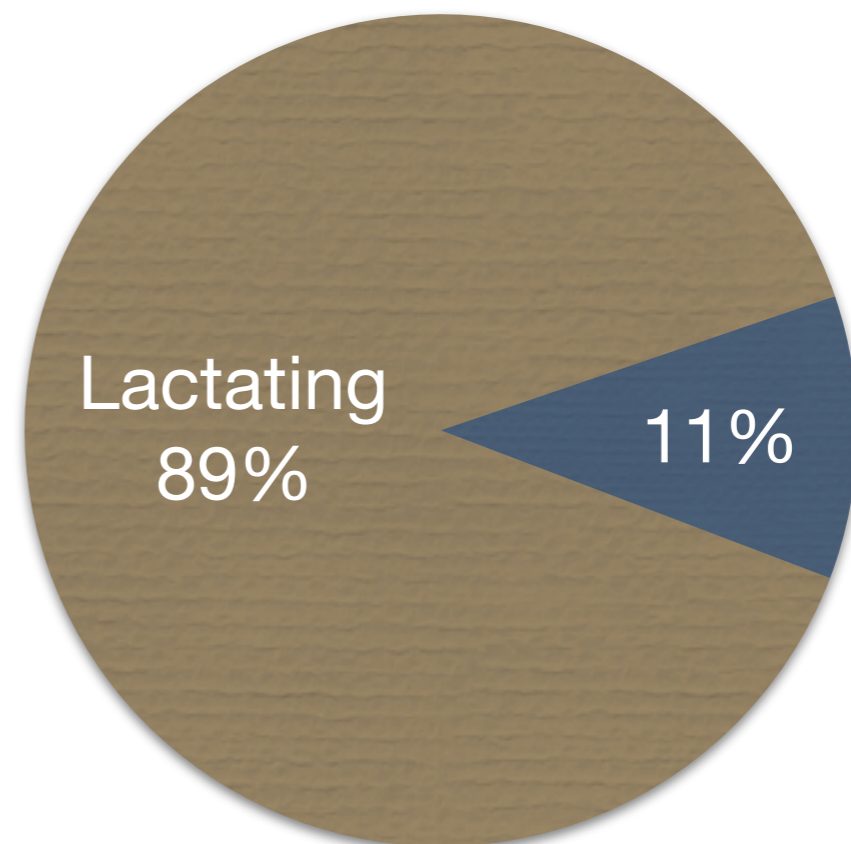
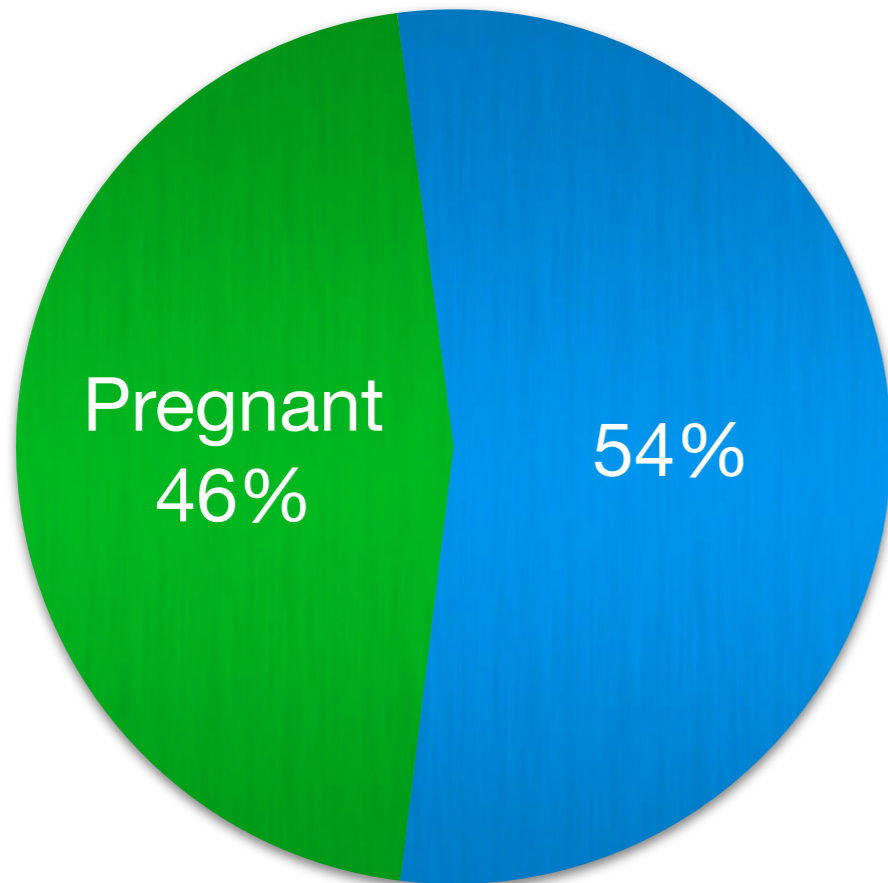
Cows by lactations

Total number of cows in records: 945



Cows by status

Total number of cows in records: 945



21-d PR (50 d)

19%

Average BW

Weighted average

lb

1st Lact	43%	1,200
2nd Lact	27%	1,400
> 2nd Lact	30%	1,650

lb

1,389

kg

631



Animal losses

Percentages (%) animals leaving the herd

Involuntary culling

Not including reproduction

27.4

Mortality

4.1

Stillbirth

6.0

Pregnancy loss

8.7

Economic values

Average of a year ending September 2014

Milk price

18.5

\$/cwt

0.41

\$/kg

Feed cost (lactating)

0.132

\$/lb

0.291

\$/kg

Feed cost (dry)

0.084

\$/lb

0.185

\$/kg

Female calf value

400

\$

Male calf value

300

\$

Heifer replacement

2,150

\$

Salvage value

0.85

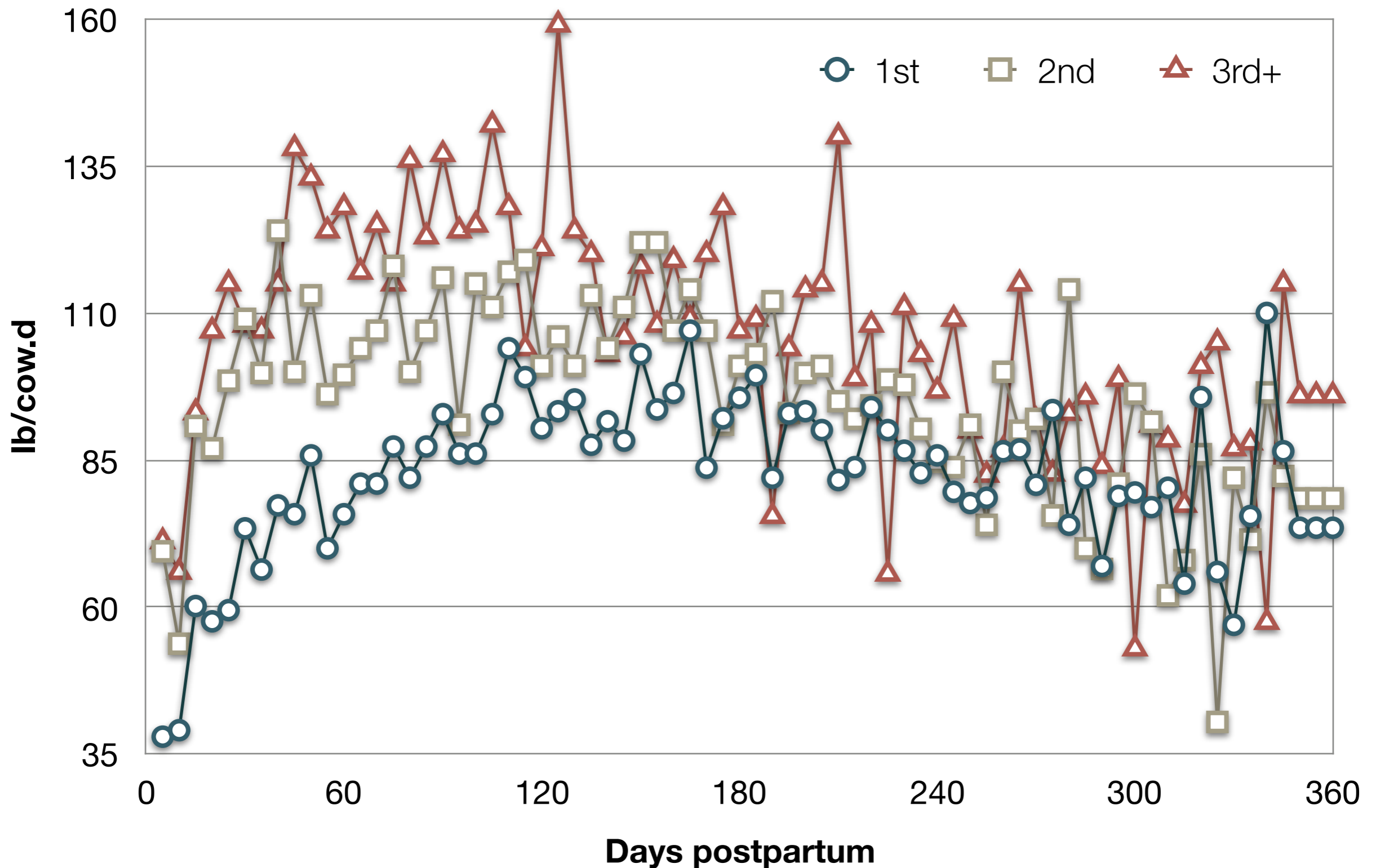
\$/lb

1.87

\$/kg

Lactation curves

Crucial for reproduction evaluation



Lactation curves

Smoothing the curves

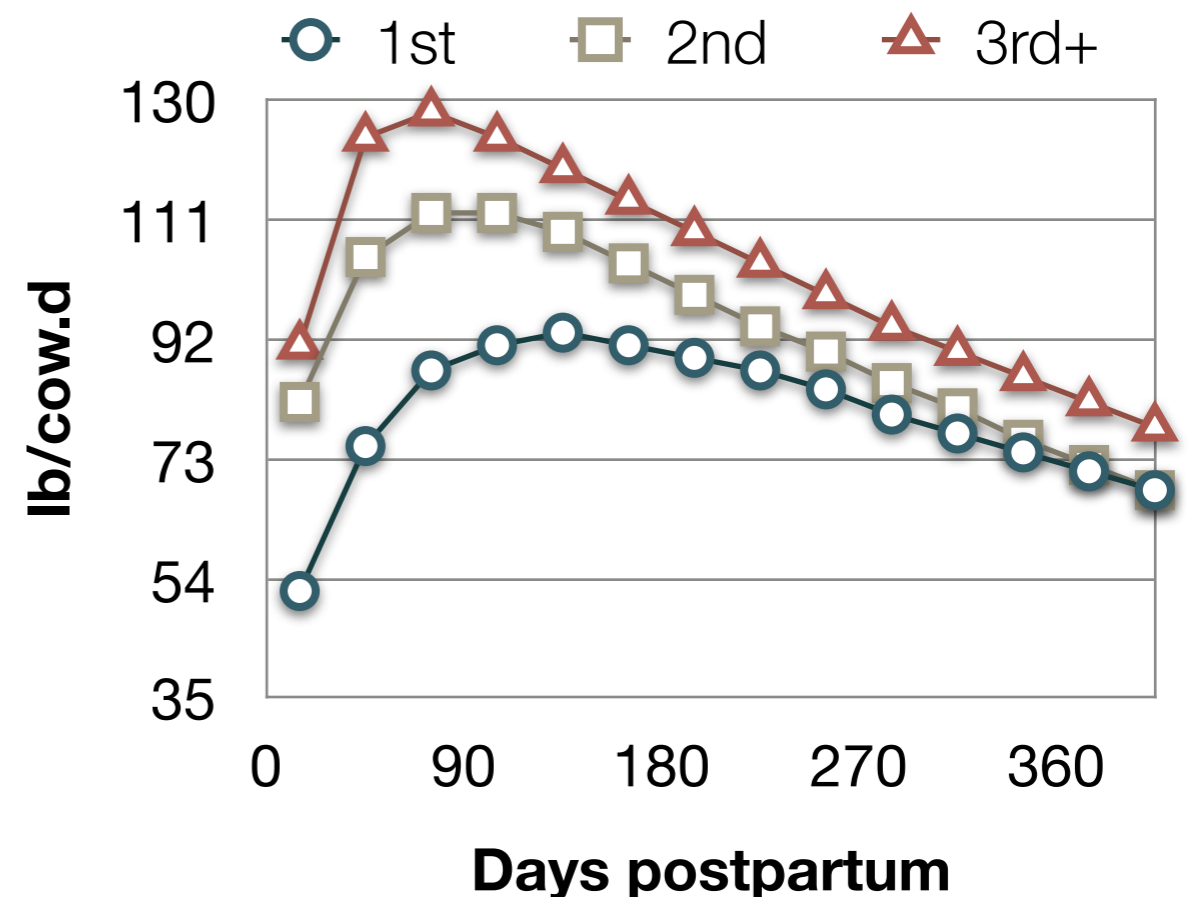
DIM	1st	2nd	3rd+
15	52	82	91
45	75	105	124
75	87	112	128
105	91	112	124
135	93	109	119
165	91	104	114
195	89	99	109
225	87	94	104
255	84	90	99
285	80	85	94
315	77	81	90
345	74	76	86
375	71	72	82
405	68	68	78

$$M_{DIM} = a \left(1 - \frac{e^{\left(\frac{c-DIM}{b}\right)}}{2} \right) e^{-d(DIM)}$$

- M = Milk Yield
- DIM = Days in milk
- a = Scale (overall capacity to produce milk)
- b = Ramp (slope of milk production rising after calving)
- c = Offset (starting amount of milk yield)
- d = Decay (rate factor of decline in milk yield after peak)

Fig.1: MilkBot's Model

Tool: Milk curve fitter



Herd and economic parameters

UWCU Repro\$

Herd Parameters

Herd Size (#)	945
Average Body Weight (lb)	1,389
Involuntary Culling (%/yr)	27.4
Mortality Rate (%/yr)	4.1
Stillbirth (%)	6.0

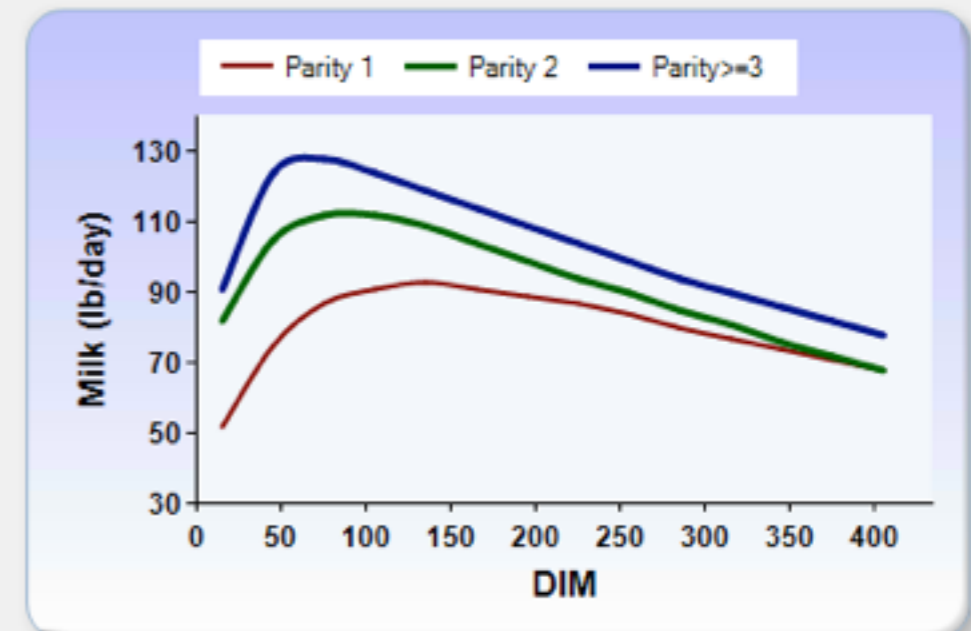
Economic Parameters

Milk Price (\$/cwt)	18.50
Cost Feed Lactating (\$/lb DM)	0.13
Dry Period Fixed Cost (\$/lb DM)	0.08
Female Calf value(\$)	400
Male Calf value (\$)	300
Heifer Replacement Value(\$)	2,150
Salvage Value (\$/lb)	0.850

Lactation Curves (lb/cow/test)

Own Farm Lactations (Enter/Edit NUMBERS Below) ▼

DIM	Parity 1	Parity 2	Parity ≥3
15	52	82	91
45	75	105	124
75	87	112	128
105	91	112	124
135	93	109	119
165	91	104	114
195	89	99	109
225	87	94	104
255	84	90	99
285	80	85	94
315	77	81	90
345	74	76	86
375	71	72	82
405	68	68	78



Next

Reproductive program

Description of program

Voluntary waiting period 1st lact, d

40

Voluntary waiting period 2nd+ lact, d

40

Estrous duration, d

22

Maximum DIM breeding 1st lact, d

338

Maximum DIM breeding 2nd lact, d

276

Maximum DIM breeding 3rd+ lact, d

236

Reproductive program

Description of program

lb

kg

Do-not-breed minimum milk/d

80

36

DIM first TAI injection, d

36

Resynch before preg check

NO

Interbreeding interval TAI, d

70

Reproductive program

Description of program

Heat bred before 1st TAI service, %
AFI detect

72

CR before 1st TAI service, %

37

CR 1st TAI service

25

Heat bred after 1st TAI service, %
AFI detect

85

CR after 1st HD services, %

29

CR 2nd+ TAI services

33

Reproductive program

Pregnancy diagnosis

Days in gestation 1st preg check, d

34

Days in gestation 2nd preg check, d

90

Days in gestation 3rd preg check, d

180

Reproductive program

Cost of semen, insemination, & pre check

Semen cost, \$/dose

15

Labor insemination, \$/AI

2.5

Ultrasound, \$/hr

30

Time used in preg check, hr/d

3

Number of cows checked, #/d

60

Reproductive program

Synchronization labor and hormones

Labor for injections, \$/hr

20

GnRH, \$/dose

2.4

PGF, \$/dose

2.08

Reproductive program

Activity monitors for heat detection (avg)

System cost, \$

40,000

Monitors, #

990

Cost per monitor, \$

65

Maintenance cost, \$/yr

5,200

Life expectancy, yr

7

Salvage value, \$

0

Reproductive program

Labor for TAI injections

	Mon	Wed	Fri
Laborers, #	1	1	1
Injections, hr/d	1	1	2
Number cows, #	90	70	130
TAI breedings	Thu		

Repro Performance

Reproductive program

UWCU Repro\$

Reproductive Programs

Current

Resynch before preg check

Programs Description

VWP (d)

Estrous Cycle Duration (d)

Maximum DIM for Breeding

Do-not-Breed Minimum Milk (lb/d)

DIM first injection for first AI sync program (d)

Weekday first injection

Interbreeding interval for TAI services (d)

Heat bred before first TAI service (%)

CR heat bred before first TAI service (%)

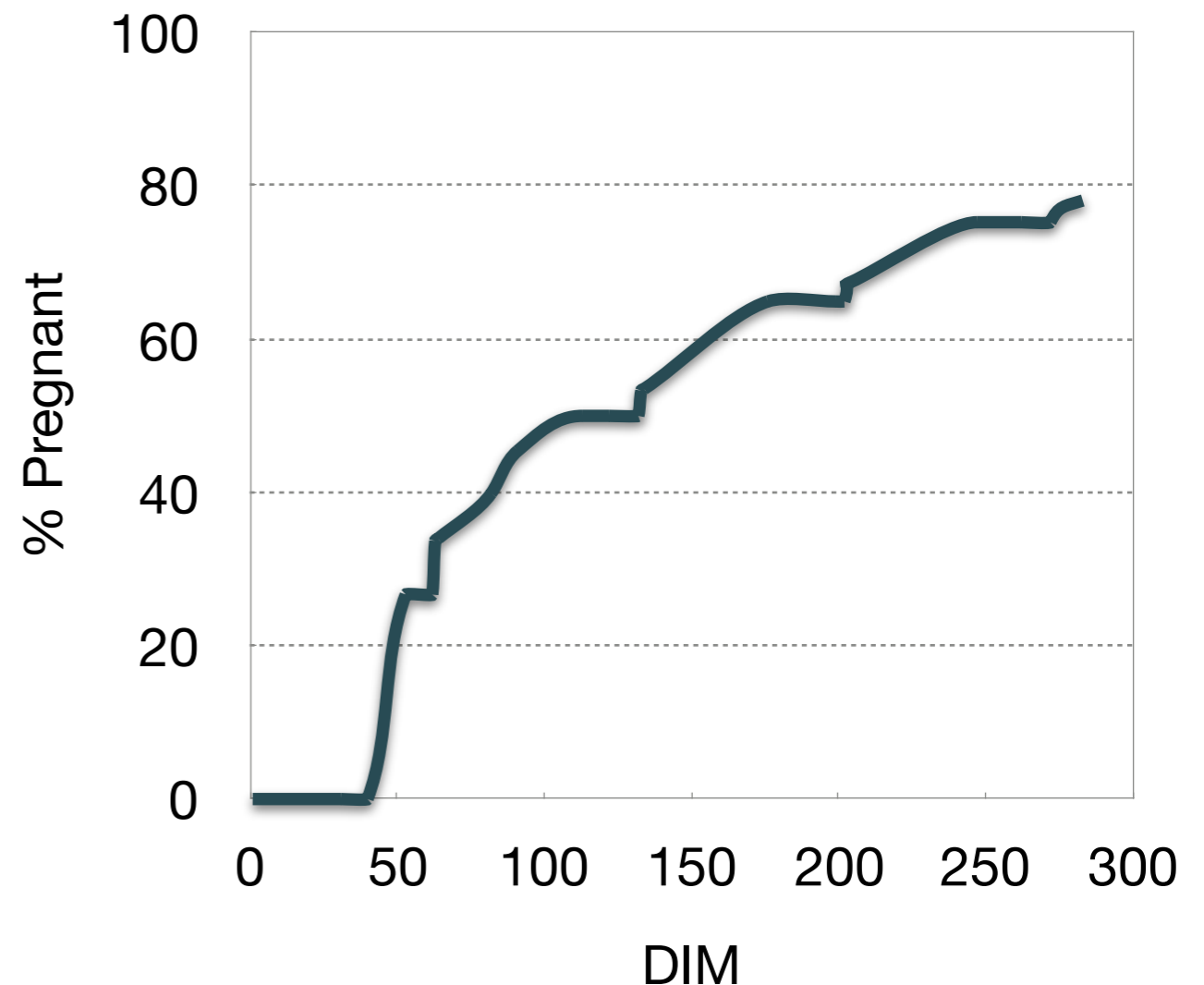
CR first TAI service (%)

Heat bred after first TAI service (%)

CR heat bred after first TAI service (%)

CR second and subsequent TAI services (%)

Pregnancy Loss (%)



21-d PR (40 d)

18%

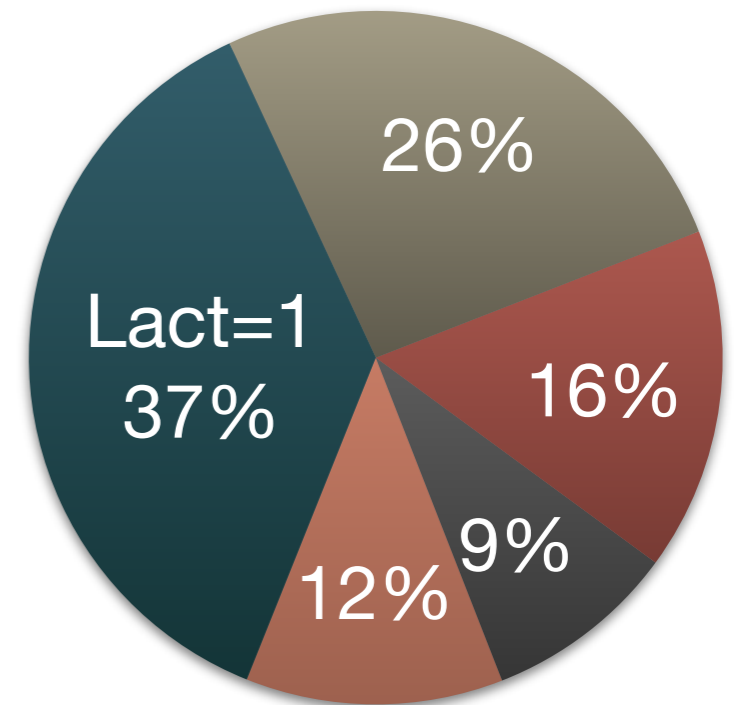
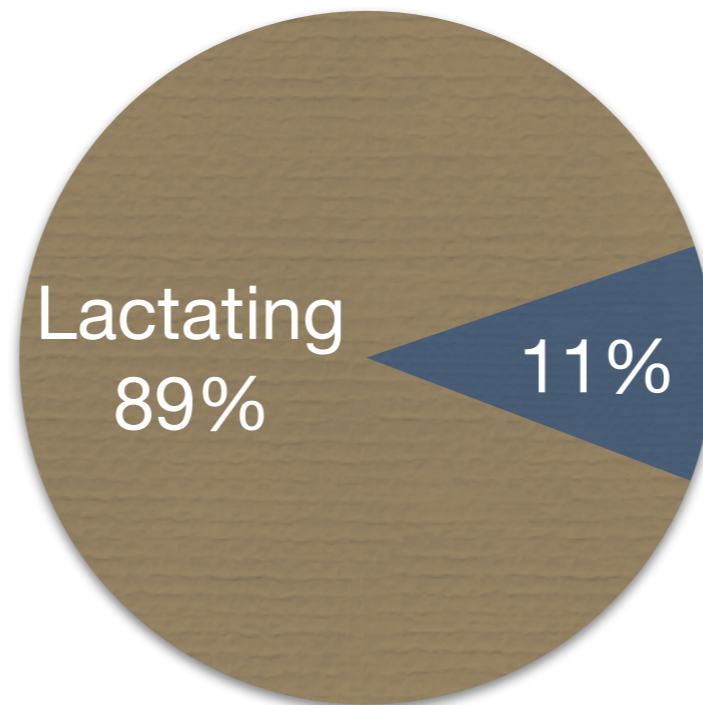
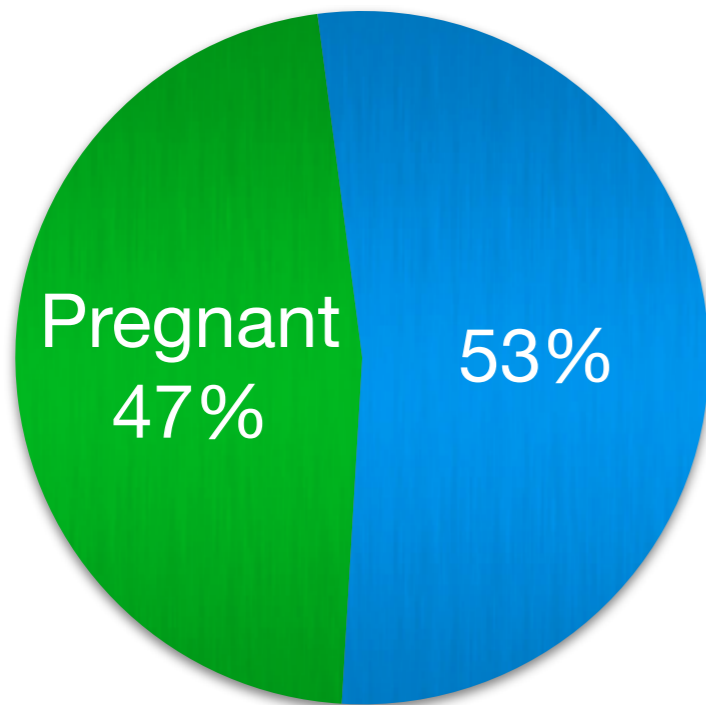
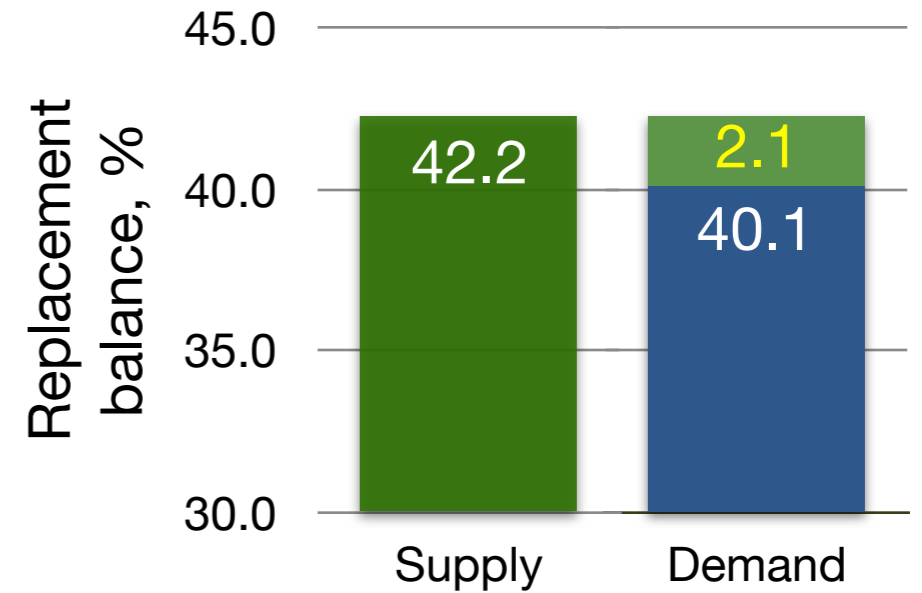
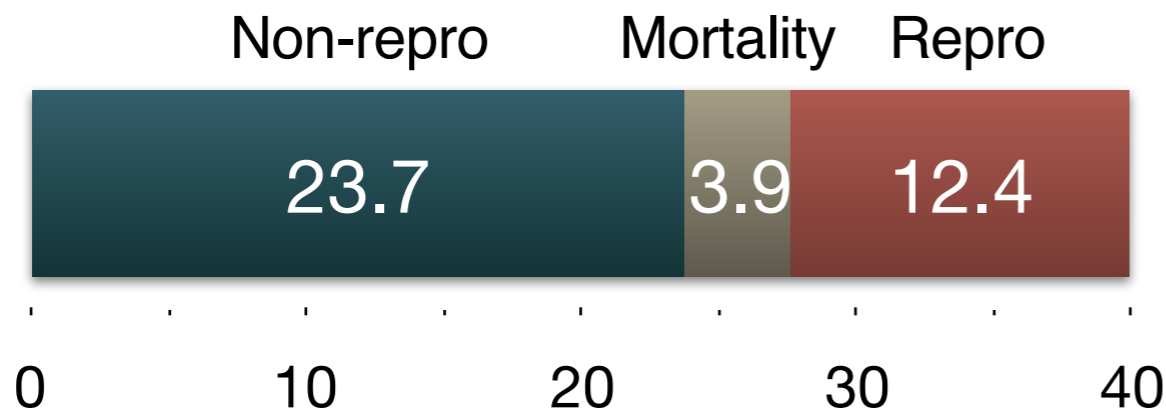
21-d PR (50 d)

19%

Reproductive program

UWCU Repro\$

Cows leaving the herd, %



Reproductive program

UWCU Repro\$

\$/cow.yr

Income over feed costs

\$3,095.2

Replacement costs

\$242.6

Reproductive costs

\$64.2

Calf revenue

\$152.7

Cow net value

\$2,941.1



What reproductive parameter is more critical to be improved in Wisconsin farm?

A. ED

C. ED CR

B. TAI CR

D. Abortion

**Management strategy
(In place July 2, 2015)**

Reproductive program

Timed Artificial Insemination program

1st TAI service postpartum

Double Ovsynch

2nd+ TAI services

Ovsynch

Weekday first injection

Friday

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					¹ GnRH	
					⁷ PGF	
	¹⁰ GnRH					
	¹⁷ GnRH					
	²⁴ PGF		²⁶ GnRH	²⁷ TAI		

Reproductive program

Description of program

lb

kg

Do-not-breed minimum milk/d

80

36

DIM first TAI injection, d

36

Resynch before preg check

YES

Interbreeding interval TAI, d

70

Reproductive program

Description of program

Heat bred before 1st TAI service, %
AFI detect

0

CR before 1st TAI service, %

0

CR 1st TAI service

47

Heat bred after 1st TAI service, %
AFI detect

23

CR after 1st HD services, %

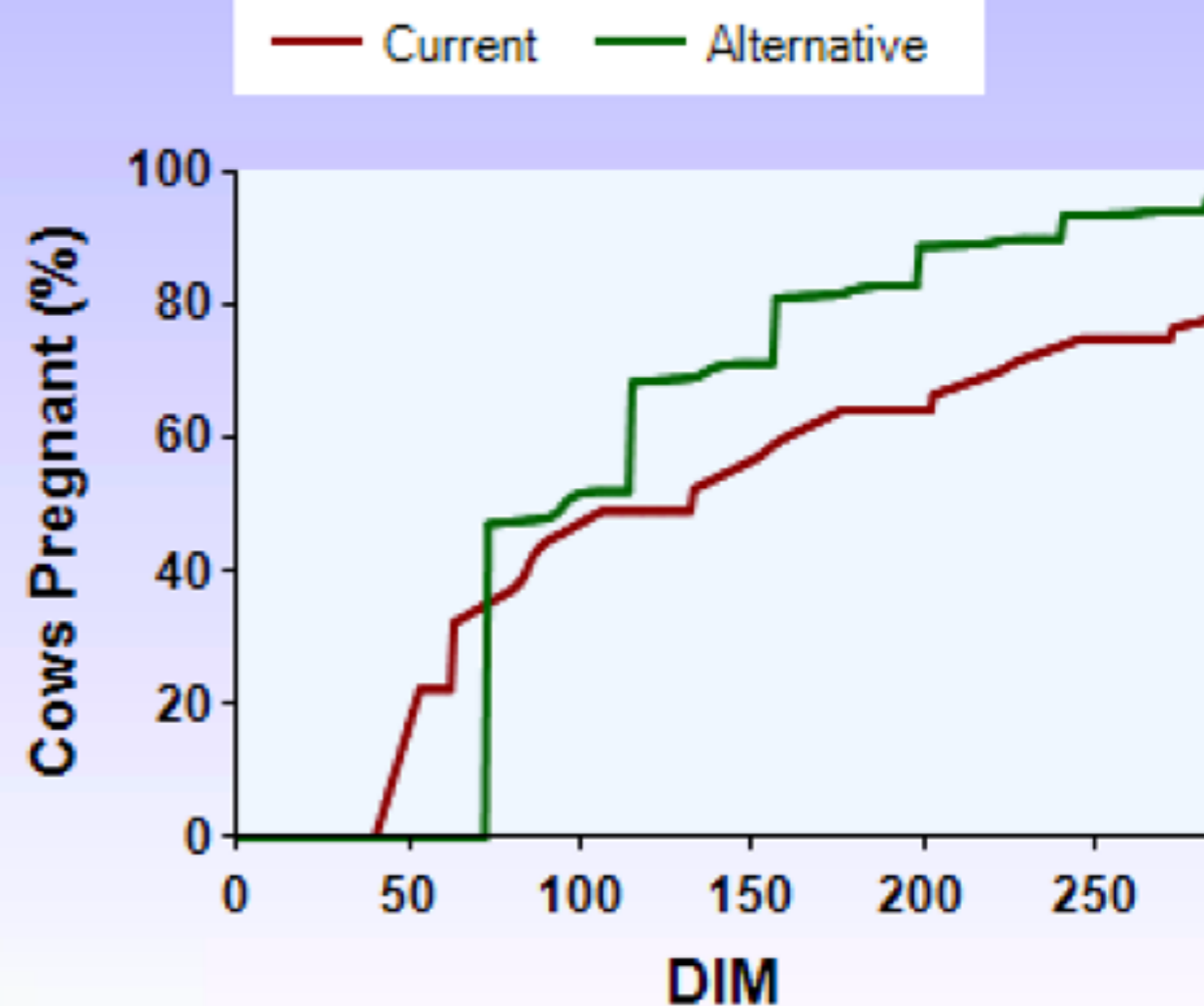
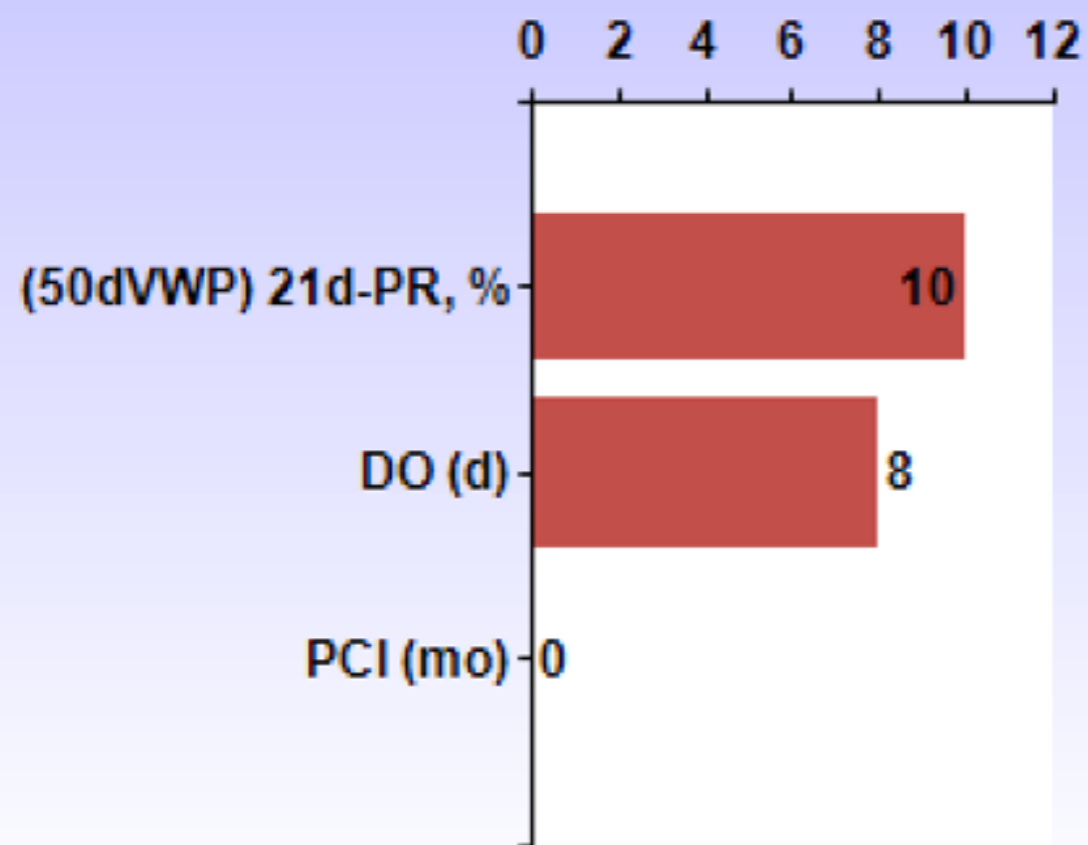
40

CR 2nd+ TAI services

40

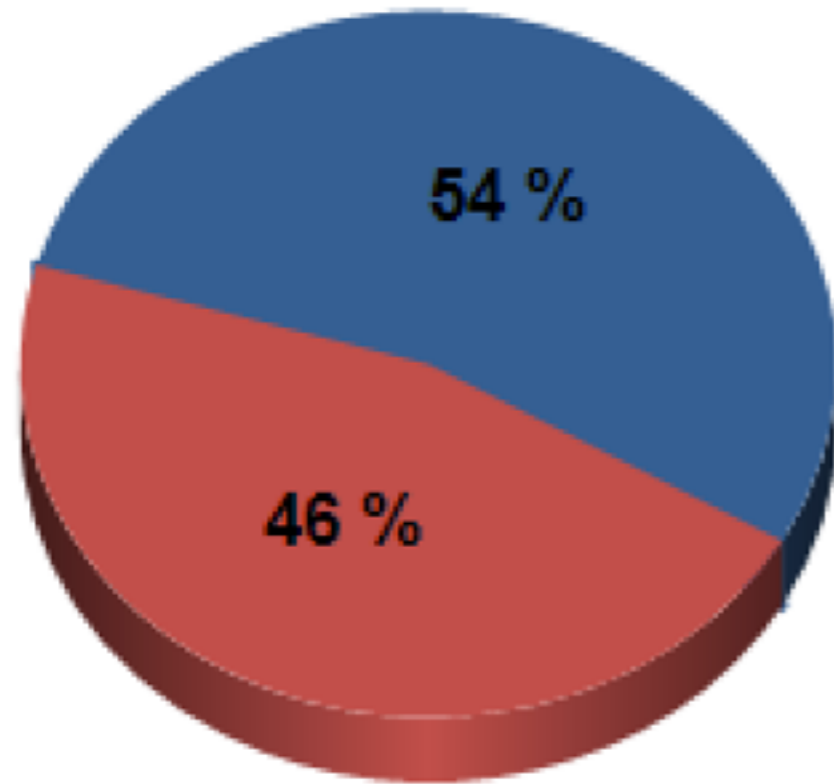
Reproductive Performance

Expected change by switching to the Alternative program



Current

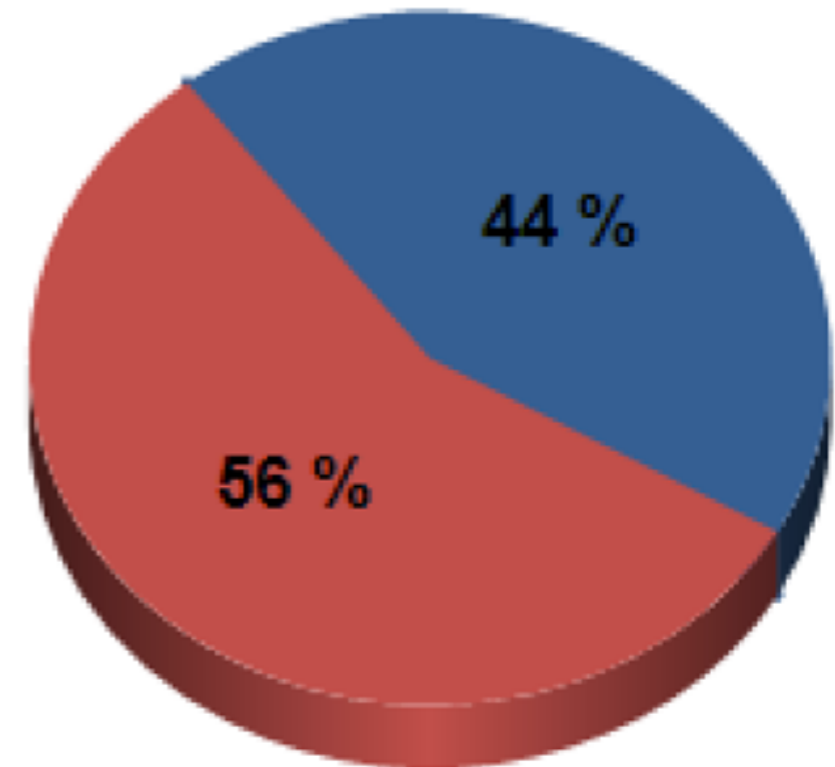
PG OP



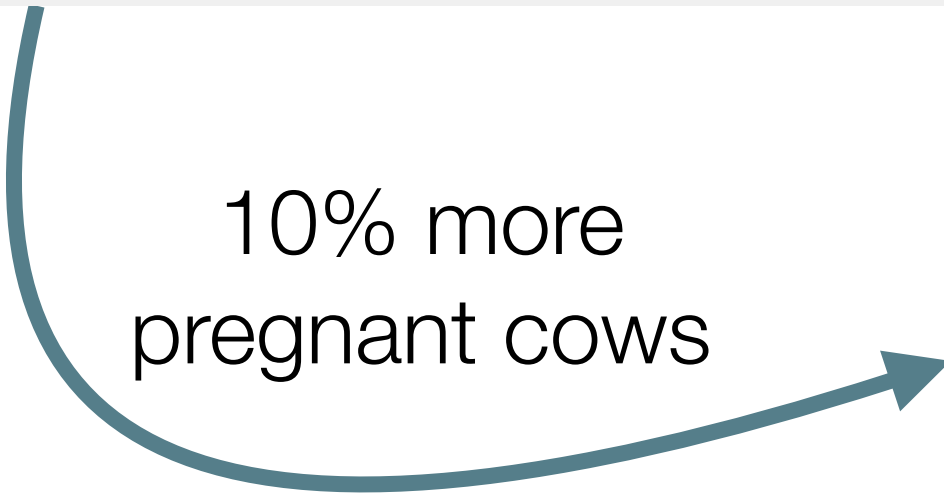
Herd Structure: Pregnant and open cows

Alternative

PG OP

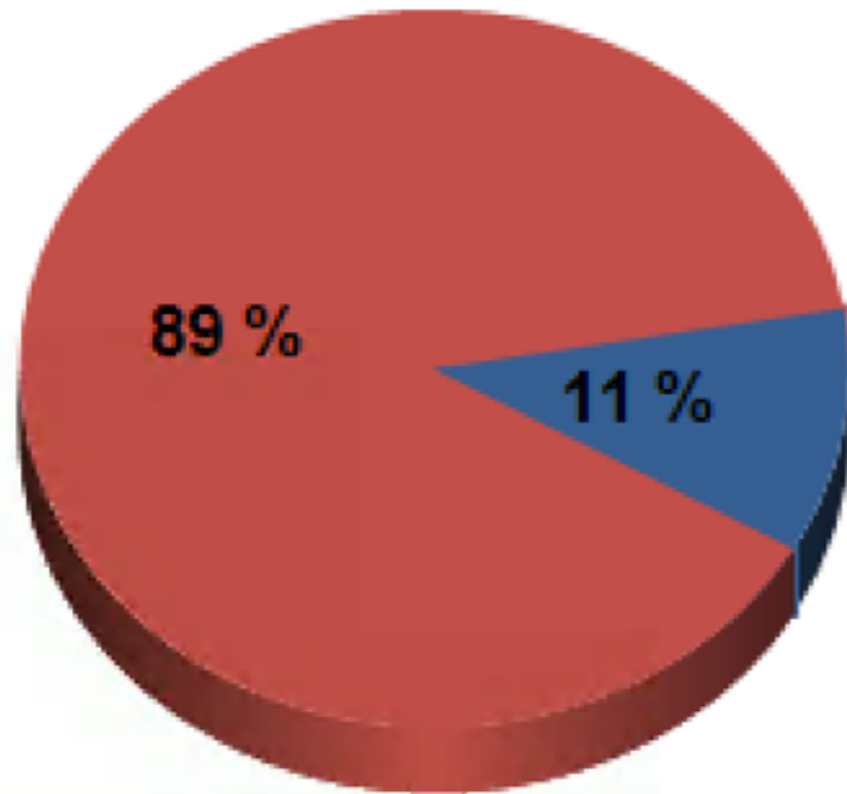


10% more
pregnant cows



Current

Lact Dry

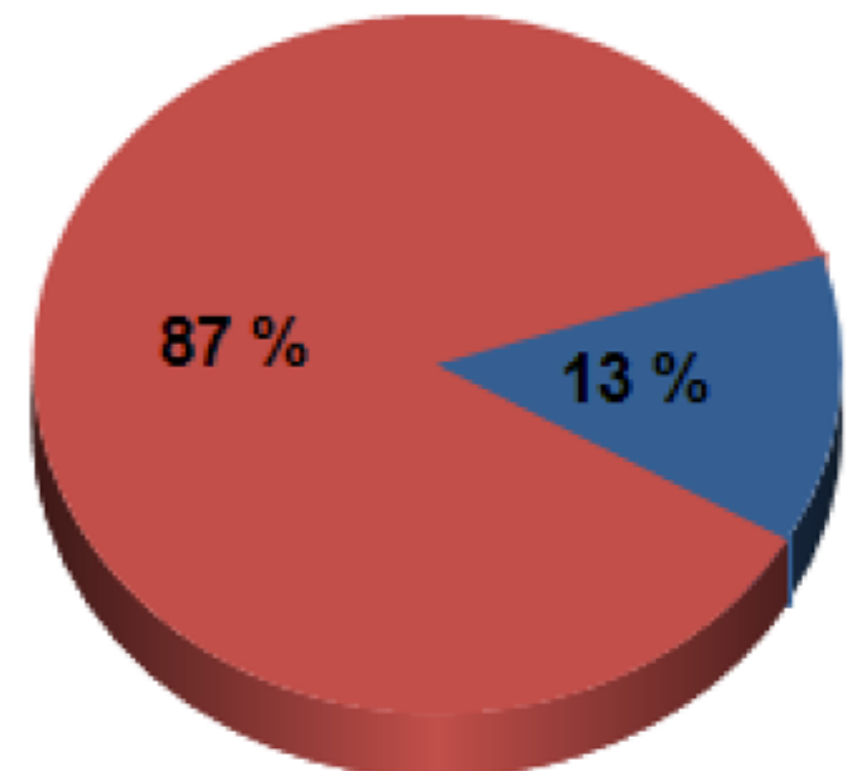


Average DIM 179

Herd Structure: Lactating and Dry cows

Alternative

Lact Dry

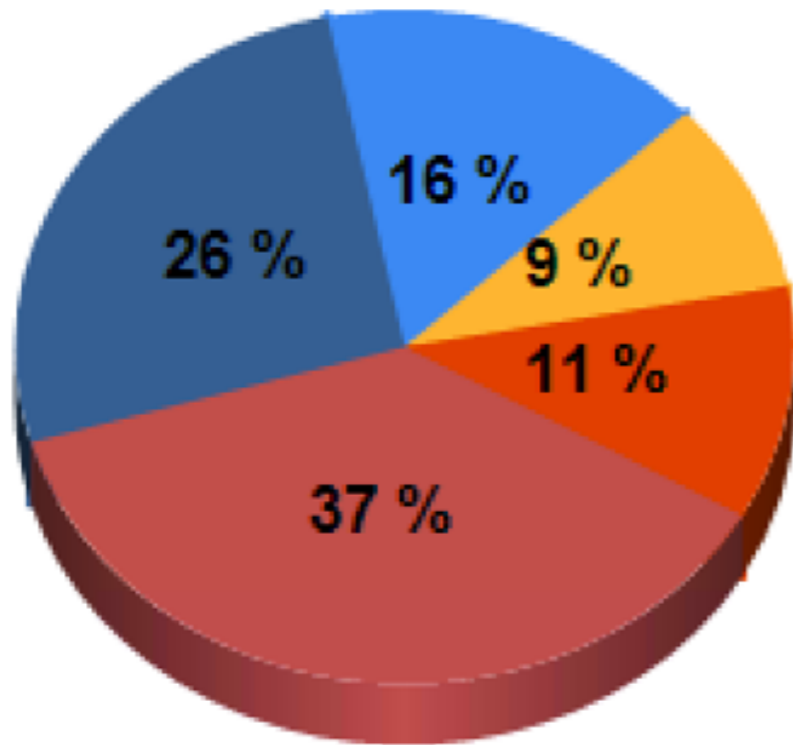


Average DIM 174

2% less
lactating cows

Current

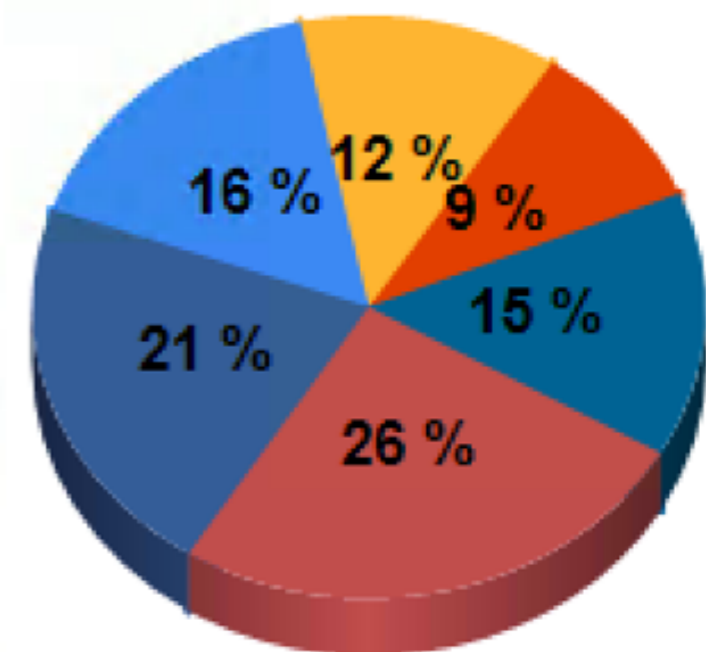
1 2 3 4 ≥ 5



Herd Structure: Lactations

Alternative

1 2 3 4 5 ≥ 6



11% less
1st lactation cows

Cows Leaving the Herd

Item	Current	Alternative	Diff
Total Culling (%)	40.3	25.9	-14.4
Non-Reproductive Culling (%)	23.8	18.8	-5
Mortality (%)	3.9	2.9	-1
Reproductive Culling (%)	12.6	4.1	-8.5

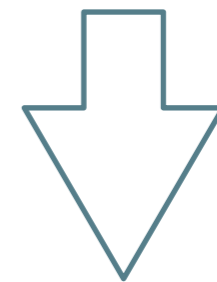
↓ **5.0% Non-reproductive culling**

↓ **1.0% Mortality**

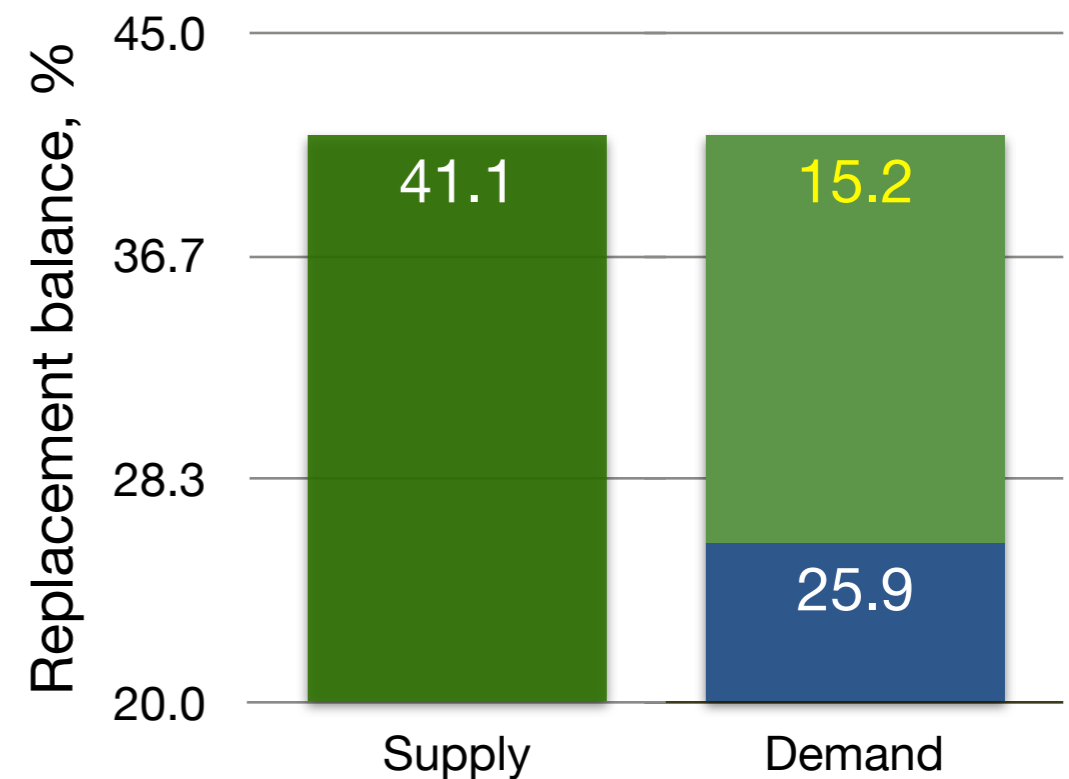
↓ **8.5% Reproductive culling**

Heifer Supply and Demand

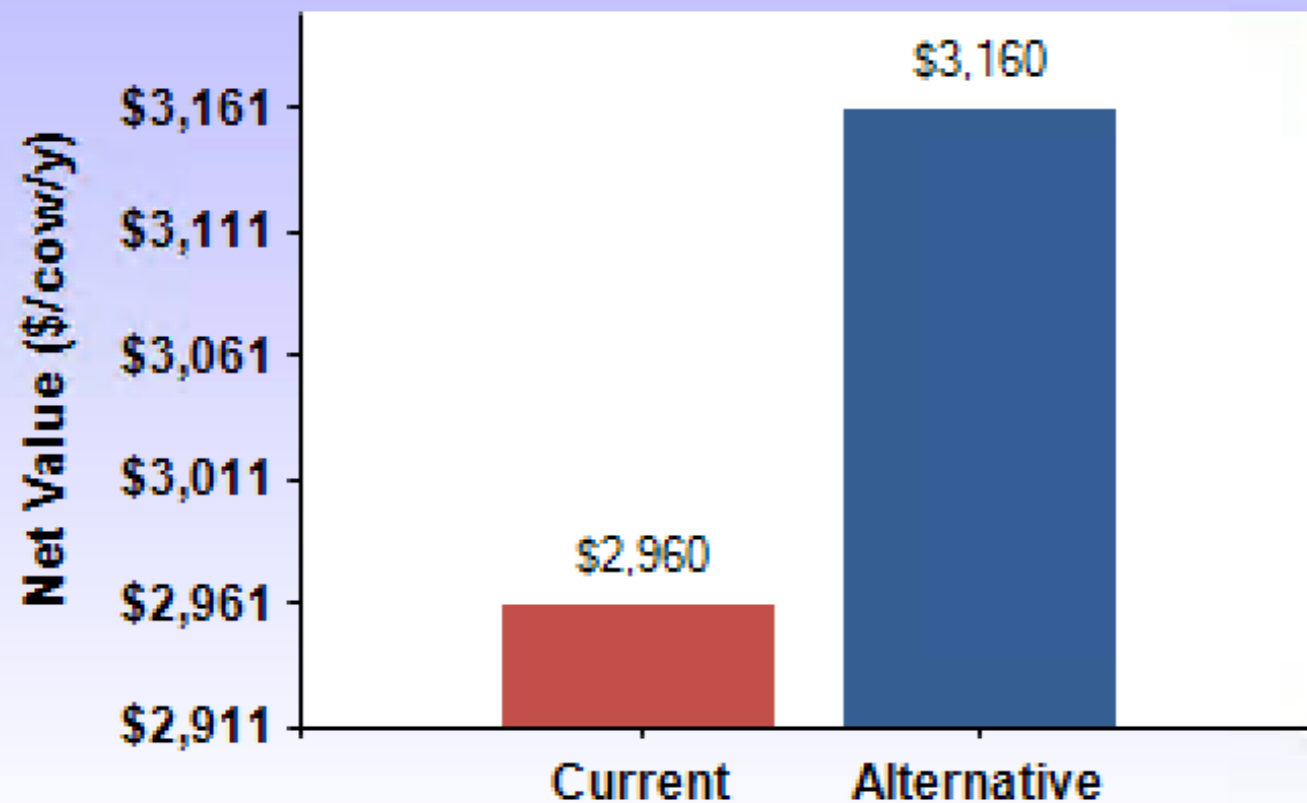
Item	Current	Alternative
Heifer Supply (% of herd/year)	42.1	41.1
Heifer Demand (% of herd/ye...	40.4	25.9
Heifer Balance (% of herd/year)	1.7	15.2



↑ **13.5% EXTRA heifer available**



Economic Results



Profit made by switching to the Alternative program

\$/herd/year



\$188,000

\$/cow/year



\$200.0

Contribution to Net Value

Item	Current	Alternative	Diff
Total Net Value (\$/cow/y)	2,960.0	3,160.0	200.0
IOFC (\$/cow/y)	3,132.6	3,202.8	70.2
Replacement Cost (\$/cow/y)	-243.4	-192.4	51.0
Reproductive Cost (\$/cow/y)	-79.6	-46.0	33.6
Calf Value (\$/cow/y)	150.4	195.6	45.2



What was the single largest economic parameter improved?

A. IOFC

C. Reproductive cost

B. Replacement cost

D. Calf value

Conclusions

Decision support available

- UW-CU Repro\$ Tool
- Open and free

Analysis are farm and market specific

- Farm and market data are required
- Minimum proficiency in dairy reproduction

Case study in Wisconsin

- Improving efficiency of TAI programs and limiting the use of ED to only remaining cows improved substantially the herd reproductive efficiency (**~10% 21-d PR**) and the herd net return (**~\$200/cow per yr**)

DairyMGT.info

The largest selection of dairy farm decision support tools

Large information

- Projects
- Publications
- Presentations
- Links

Heart of DairyMGT.info

Tools

to Support
Decision-Making

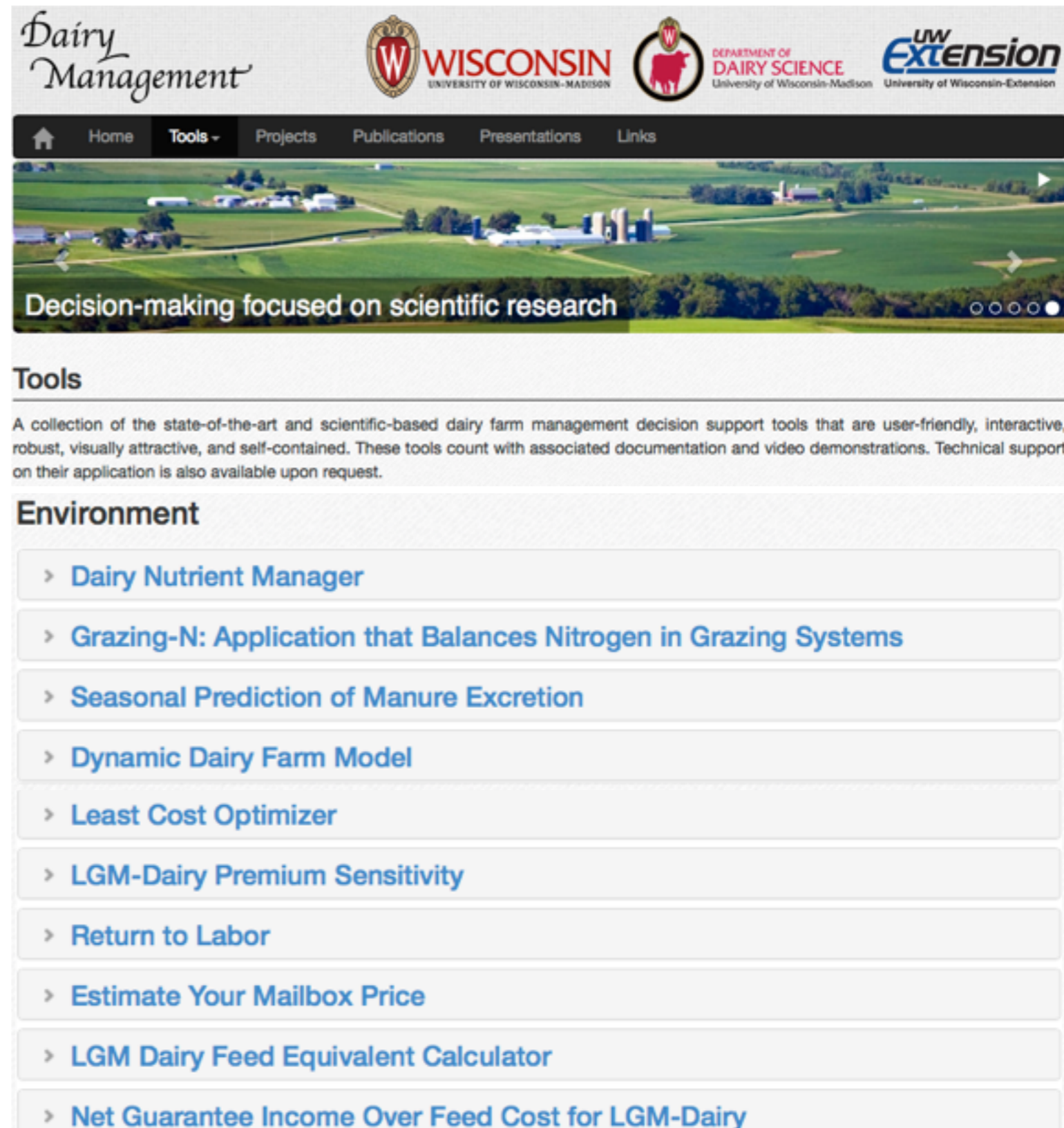
The screenshot shows the DairyMGT.info website interface. At the top, there are logos for 'Dairy Management', 'WISCONSIN UNIVERSITY OF WISCONSIN-MADISON', 'DEPARTMENT OF DAIRY SCIENCE University of Wisconsin-Madison', and 'UW Extension University of Wisconsin-Extension'. Below the logos is a navigation menu with 'Home -', 'Tools', 'Projects', 'Publications', 'Presentations', and 'Links'. The 'Tools' menu item is circled in red, with an arrow pointing to it from the left. Below the navigation menu is a banner image of a herd of brown cows in a field, with the text 'Model-based decision support tools' overlaid. Below the banner is a paragraph of text: 'This site is designed to support dairy farming decision-making focusing on model-based scientific research. The ultimate goal is to provide user-friendly computerized decision support tools to help dairy farmers improve their economic performance along with environmental stewardship.' Below this text is a red dashed circle containing a blue icon of a hammer and wrench, with the text 'UW-Dairy Management Decision Support TOOLS' next to it. An arrow points from the left towards this icon. To the right of the icon is a list of 'Latest Projects' including 'Improving Dairy Farm Sustainability', 'Genomic Selection and Herd Management', 'Dairy Reproduction Decision Support Tools', 'Strategies of Pasture Supplementation', and 'Improving Dairy Cow Fertility'. Below the projects is a 'Contact' section for Victor E. Cabrera, Ph.D., with a photo and contact information. To the right of the contact section is a 'Helpful Link' section for 'Repro Money Program' and a 'Tweets' section showing two tweets from Victor E. Cabrera. At the bottom of the page are social media icons for LinkedIn, Facebook, Twitter, YouTube, and Google+.

DairyMGT.info: Tools

>40 Decision Support Tools

Many areas of dairy farm management

- Feed
- Replacements
- Reproduction
- Production
- Replacement
- Environment
- Finances
- Genetics
- Health
- ...



The screenshot shows the DairyMGT.info website. At the top, there is a navigation bar with links for Home, Tools (selected), Projects, Publications, Presentations, and Links. The header includes the 'Dairy Management' logo, the University of Wisconsin-Madison logo, the Department of Dairy Science logo, and the UW Extension logo. Below the navigation bar is a large banner image of a dairy farm with the text 'Decision-making focused on scientific research'. Underneath the banner is a section titled 'Tools' with a descriptive paragraph: 'A collection of the state-of-the-art and scientific-based dairy farm management decision support tools that are user-friendly, interactive, robust, visually attractive, and self-contained. These tools count with associated documentation and video demonstrations. Technical support on their application is also available upon request.' Below this is a section titled 'Environment' containing a list of tools, each with a right-pointing chevron icon:

- > Dairy Nutrient Manager
- > Grazing-N: Application that Balances Nitrogen in Grazing Systems
- > Seasonal Prediction of Manure Excretion
- > Dynamic Dairy Farm Model
- > Least Cost Optimizer
- > LGM-Dairy Premium Sensitivity
- > Return to Labor
- > Estimate Your Mailbox Price
- > LGM Dairy Feed Equivalent Calculator
- > Net Guarantee Income Over Feed Cost for LGM-Dairy

Anatomy of tools

How to explore and use them

Title



Link to the tool



Brief description
Supporting Documents



Video Demo



Economic Value of A Dairy Cow

Calculates the projected net return of a cow or the entire herd

- Online Tool ([Open](#))
- Excel Spreadsheet ([Download](#))
- Presentation ([Download](#))
- Paper ([Download](#))
- Magazine Article ([Download](#))
- Demo ([Click to View/Hide the Video](#))

Economic Value of A Dairy Cow

Herd Production and Reproduction Variables		Reproduction Costs, \$	
Herd Turnover Ratio, %/year	35	Replacement Transaction, \$	704
Roloff Herd Average, lb/cow per year	24,000	Herd Structure at Steady State	
21-d Pregnancy Rate, %	18	Days in milk	224
Reproduction Cost, \$/cow per month	20	Days to Conception	122
Last Month After Calving to Breed a Cow	10	Percent of Pregnant	52
Do-not-Breed Cow Minimum Milk, lb/day	30	Reproductive Culling, %	8
Pregnancy Loss after 35 Days Pregnant, %	22.6	Mortality, %	3
Average Cow Body Weight, lb	1306	1st Lactation, %	43
Herd Economic Variables		2nd Lactation, %	27
Replacement Cost, \$/cow	1300	> 3rd Lactation, %	30
Salvage Value, \$/lb live weight		Economics of an Average Cow, \$/year	
Calf Value, \$/calf		Net Return, \$	1998
Milk Price, \$/cwt		Milk Sales, \$	3834
Milk Butterfat, %		Feed Cost, \$	-1522
Feed Cost Lactating Cows, \$/lb dry matter	0.1	Calf Sales, \$	60
Feed Cost Dry Cows, \$/lb dry matter	0.08	Non-Reprod. Culling Cost, \$	-198
Interest Rate, %/year	6	Mortality Cost, \$	-38
		Reproductive Culling Cost, \$	-99
		Reproductive Cost, \$	-80

Spanish Version
Herramienta ([Abrir](#))

Other languages



The value of a cow and reproduction

Important relationship for decision-making

Opportunities for cow-level reproductive management.

E.g.,

High value cow  **more inseminations**

Low value cow  **lower quality semen**

Associated economic values could be used to enhance the value of reproductive programs. E.g.,

The value of a new pregnancy

The cost of a pregnancy loss

The cost of an additional day open

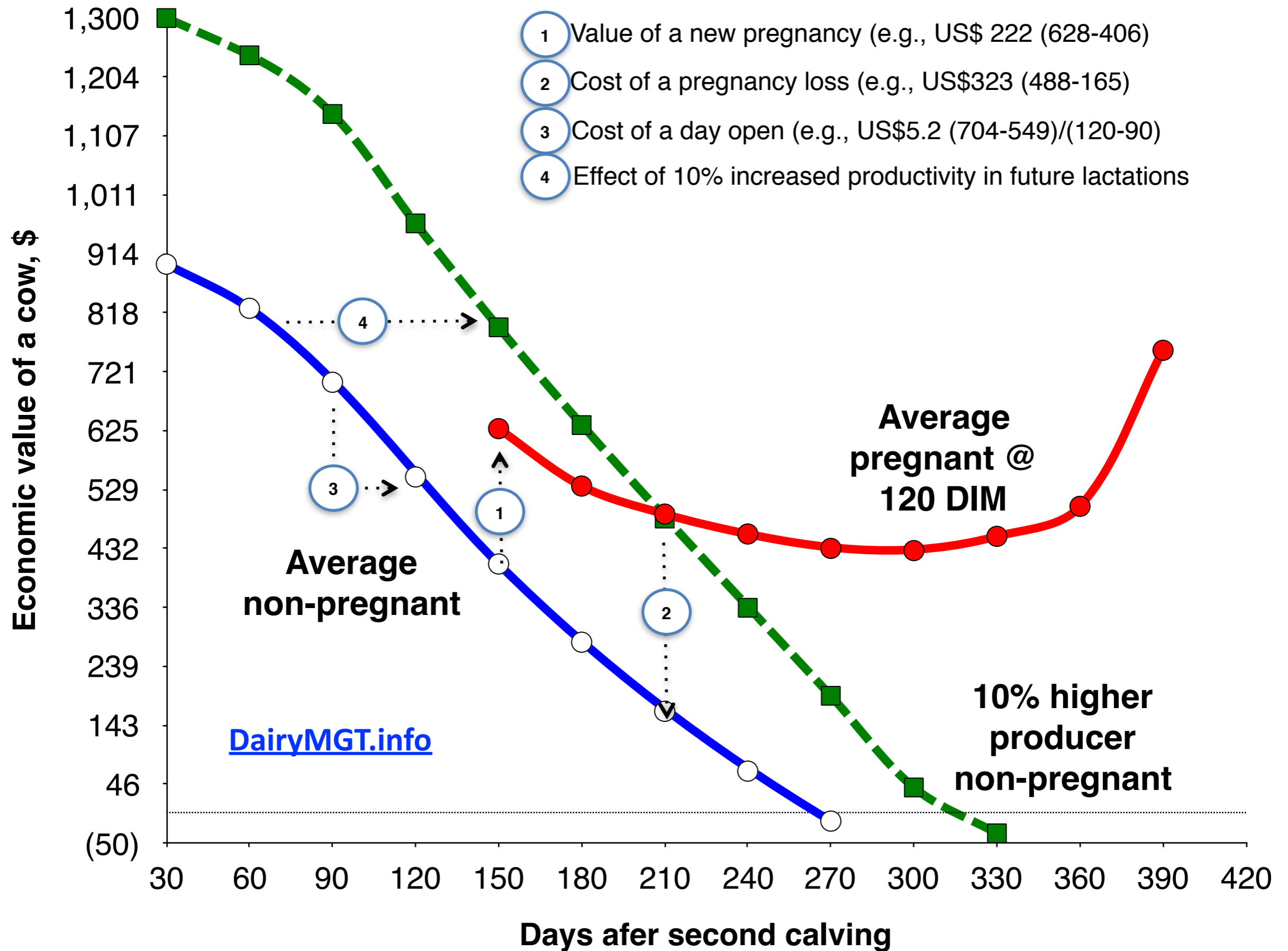
The value of a cow

Long-term expected net return of a cow compared with that of an imminent replacement

Critical factors

- **Cow's productivity level in relation to herd mates**
- **Replacement's genetic improvement in relation to herd mates**
- **Cow's current conditions**
 - Lactation
 - Days after calving
 - Pregnancy status

The value of a cow



The Economic Value of a Dairy Cow

INPUTS - Edit Values in This Block

Evaluated Cow Variables

Current Lactation	2
Current Months after Calving	8
Current Months in Pregnancy	6
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, kg/cow per year	10890
21-d Pregnancy Rate, %	18
Reproduction Cost, \$/cow per month	20.00
Last Month After Calving to Breed a Cow	10
Do-not-Breed Cow Minimum Milk, kg/day	22.68
Pregnancy Loss after 35 Days Pregnant, %	22.6
Average Cow Body Weight, kg	592.39

Herd Economic Variables

Replacement Cost, \$/cow	1300.00
Salvage Value, \$/kg live weight	0.84
Calf Value, \$/calf	100.00
Milk Price, \$/kg	0.35
Milk Butterfat, %	3.5
Feed Cost Lactating Cows, \$/kg dry matter	0.22
Feed Cost Dry Cows, \$/kg dry matter	0.18
Interest Rate, %/year	6

OUTPUTS - Interactive Results

Value of the Cow, \$	507
Compared Against a Replacement, \$	
Milk Sales, \$	-67
Feed Cost, \$	-111
Calf Value, \$	71
Non-reproductive Cull, \$	-111
Mortality Cost, \$	-21
Reproductive Cull, \$	21
Reproduction Costs, \$	20
Replacement Transaction, \$	704
Herd Structure at Steady State	
Days in milk	224
Days to Conception	122
Percent of Pregnant	52
Reproductive Culling, %	8

Changes to
\$71 if **aborted**
So, a loss of
\$436

The tool Economic Value of a Dairy Cow can be used to calculate the cost of a pregnancy loss, value of a new pregnancy, or cost per day open



How the value of a cow can be used for reproductive decision-making?

A. Breeding opportunities

B. Semen quality selection

C. Calculate the cost of a pregnancy loss

D. All the above

The value of using sexed semen

Producers using it in heifers

Important considerations

- Ratio of females increases greatly
 - E.g., 47% (conventional) to 89% (sexed)
- Conception rate decreases
 - ~ 20% (DeJarnette et al, 2009)
- Sexed semen has a premium cost
 - Double or triple conventional
- Less proportion of male calves reduces the cost of dystocia

Economic considerations of sexed semen

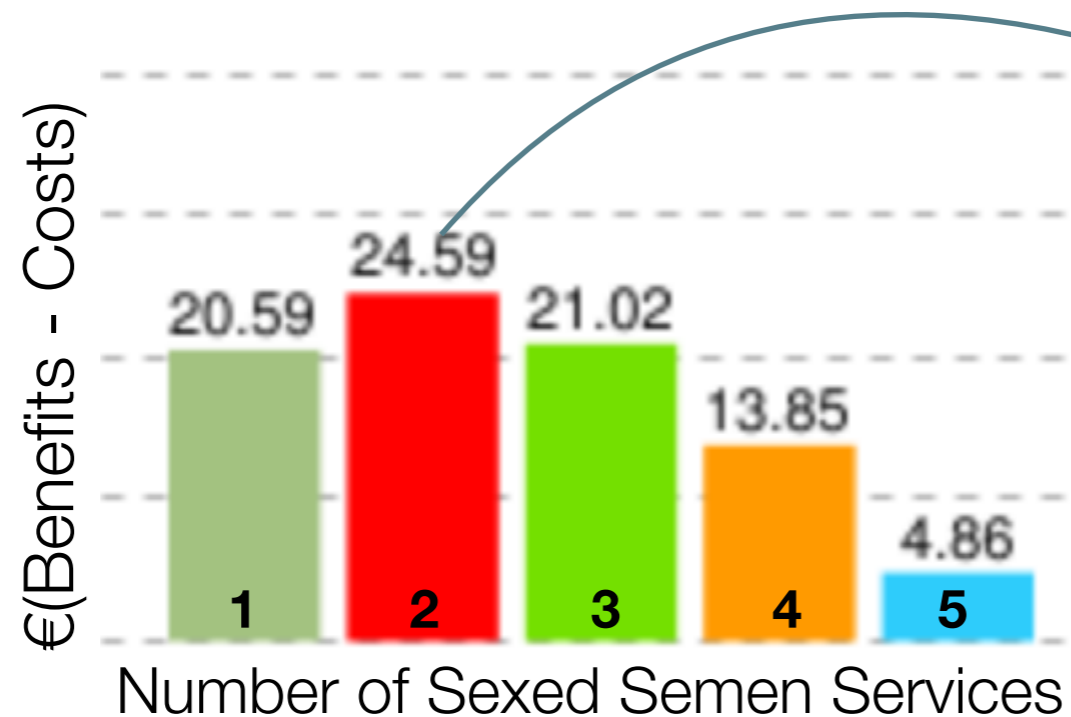
Economic gains of using sexed semen

- More production of more valuable female calves
- Reduced cost of treatment of dystocia

Economic costs of using sexed semen

- More breedings to same level of pregnancy
- Longer raising time for heifers becoming pregnant later
- More culling for reproductive failure
- Extra cost of sexed semen

An example of sexed semen analysis



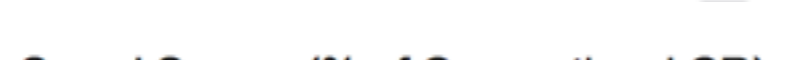
Best economic value of using sexed semen occurs when it is used in 1st and 2nd heifer breedings

Expected Females (%)

Conventional



Sexed



Sexed Semen (% of Conventional CR)



Conventional Semen Average CR (%)



Semen Cost (&)

Conventional

Sexed

Female Calf (\$)

Male Calf (\$)

Raising Cost (\$/d)

Salvage Value (\$/cwt)

Dystocia Cost(\$/heifer)

20-mo Pregnant Heifer(\$)



When sexed semen use makes sense economically?

A. Always

B. When the sexed semen cost is low

C. When the CR is high

D. When benefits less costs are positive

Thanks

DairyMGT.info



*Dairy
Management*



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