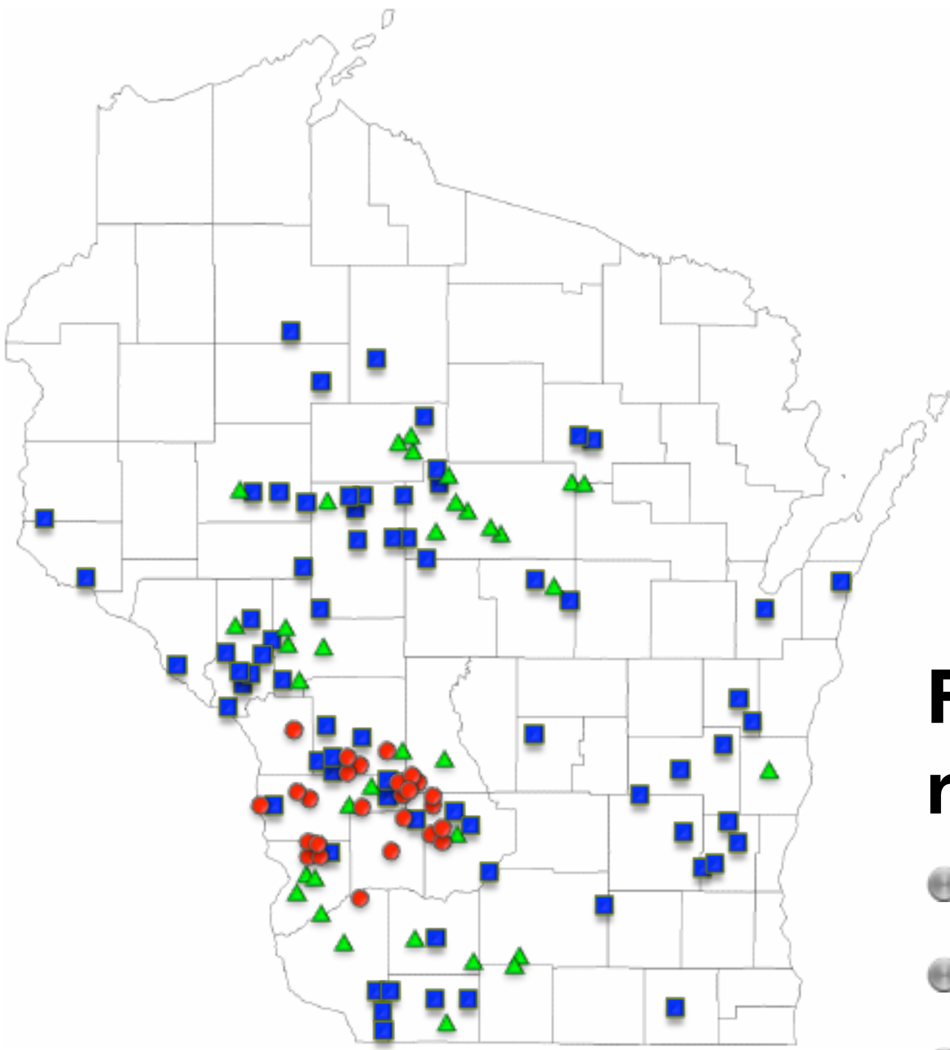
UW-Madison Station Report

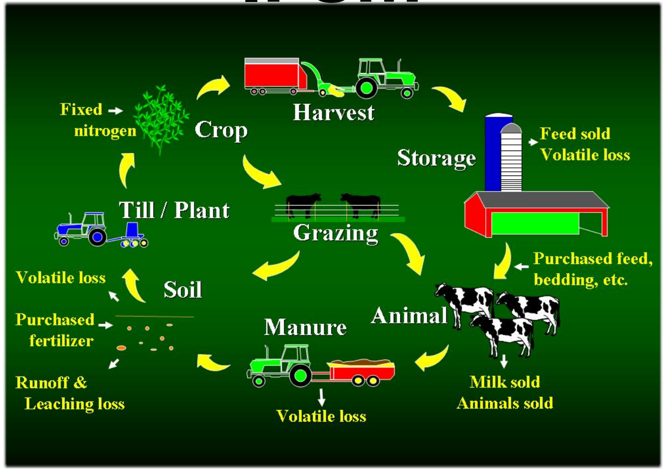
Victor E. Cabrera
University of Wisconsin-Madison

NC-2042 Annual Meeting, 8-11 October 2014
Lied Lodge and Conference Center, Nebraska City, NE

Dutreuil, M., M. Wattiaux, C. A. Hardie, and **V. E. Cabrera**. 2014. Feeding strategies and manure management for cost effective mitigation of greenhouse gas emissions from dairy farms in Wisconsin. ***Journal of Dairy Science 97:5904-5917.***



IFSM



Farms used for defining representative farms

- 69 organic
- 30 grazing
- 27 conventional

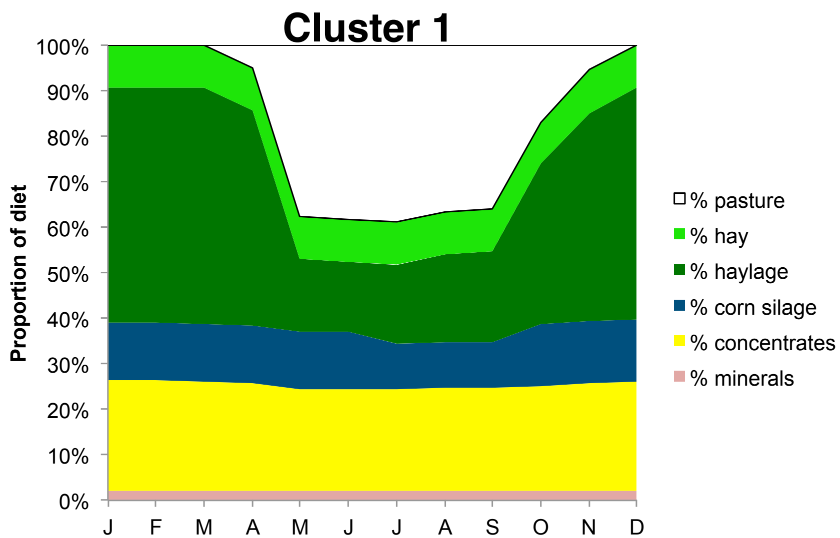
Dutreuil, M., M. Wattiaux, C. A. Hardie, and ***V. E. Cabrera****. 2014. Feeding strategies and manure management for cost effective mitigation of greenhouse gas emissions from dairy farms in Wisconsin.* ***Journal of Dairy Science 97:5904-5917.***

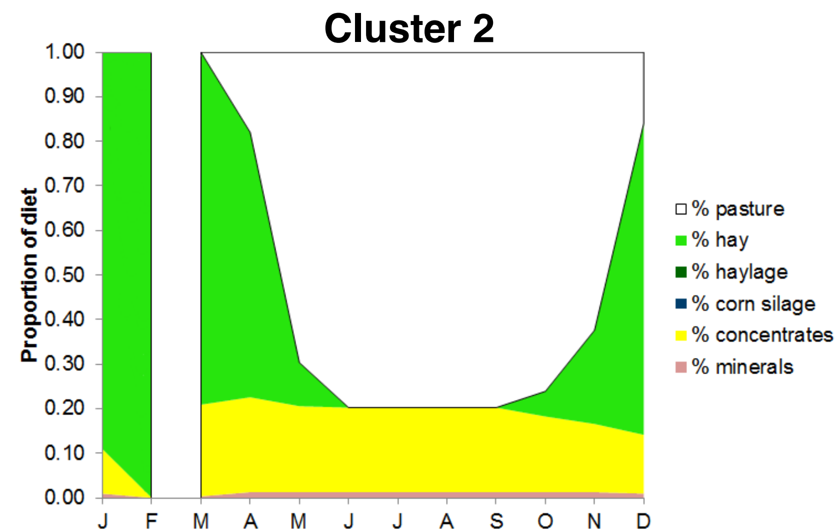
	1	2	3	4	5	6
Milk production	9,735	0	-406	0	0	-406
Feed costs ($)	182,124	-994	-1,795	116	-1,425	-1,349
Total income ($)	357,151	3,668	-7,979	177	3,865	-7,780
Net return to management ($)	23,895	**7,005**	-802	-3,536	3,180	-4,641
Net return to management ($/1,000 kg milk)	28.9	**8.4**	0.2	-4.3	3.8	-4.6
Net emission (kg CO_2 eq/kg milk)	0.58	-0.16	-0.15	-0.08	**-0.18**	**-0.18**
Net emission (kg CO_2 eq/yr)	476,623	-126,959	136,289	-60,550	-148,829	**-157,555**

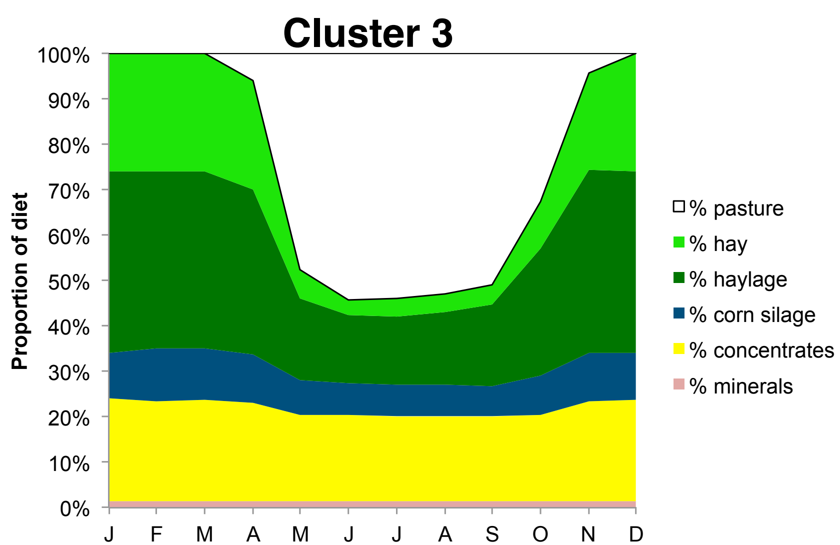
Dutreuil, M., M. Wattiaux, C. A. Hardie, and ***V. E. Cabrera****. 2014. Feeding strategies and manure management for cost effective mitigation of greenhouse gas emissions from dairy farms in Wisconsin.* ***Journal of Dairy Science 97:5904-5917.***

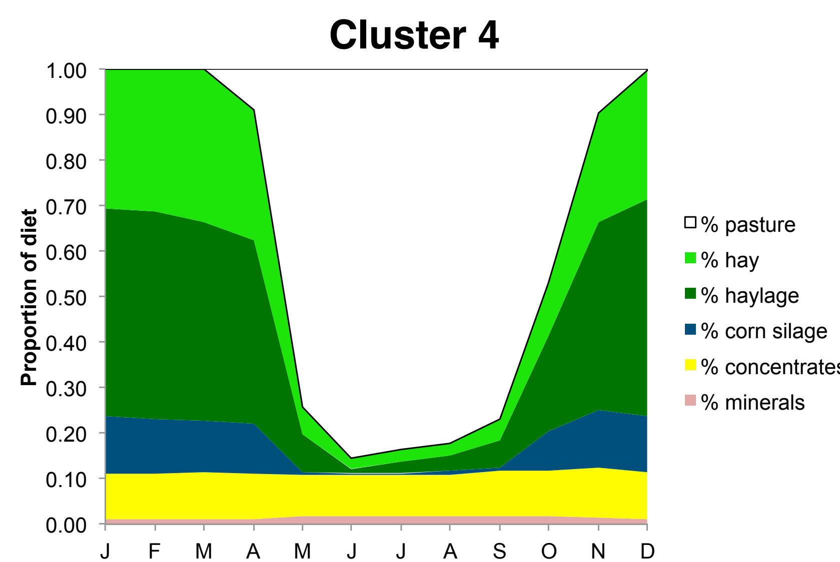
	1	6	7	8	9	10
Milk production	7,256	362	725	0	362	725
Feed costs ($)	134,133	34,797	36,670	242	34,994	36,871
Total income ($)	288,603	21,560	32,627	95	21,614	32,681
Net return to management ($)	14,439	-12,846	-4,683	-3,565	-16,407	-8,247
Net return to management ($/1,000 kg milk)	23.4	-20.9	-9.0	-5.8	-26.4	**-14.3**
Net emission (kg CO_2 eq/kg milk)	0.66	-0.17	**-0.18**	0.04	-0.13	**-0.15**
Net emission (kg CO_2 eq/yr)	405,565	-86,729	-81,796	24,506	-65,447	-60,282

*Hardie, C., M. Wattiaux, M. Dutreuil, R. Gildersleeve, N. Keuler, and **V. E. Cabrera**. 2014. Feeding strategies on certified organic dairy farms in Wisconsin and their impact on milk production and income over feed costs. **Journal of Dairy Science 97:4612-4623.***









Hardie, C., M. Wattiaux, M. Dutreuil, R. Gildersleeve, N. Keuler, and **V. E. Cabrera**. 2014. Feeding strategies on certified organic dairy farms in Wisconsin and their impact on milk production and income over feed costs. **Journal of Dairy Science 97:4612-4623.**

Table 3.1b. Cluster and total sample medians (interquartile ranges) for the clustering and evaluated variables

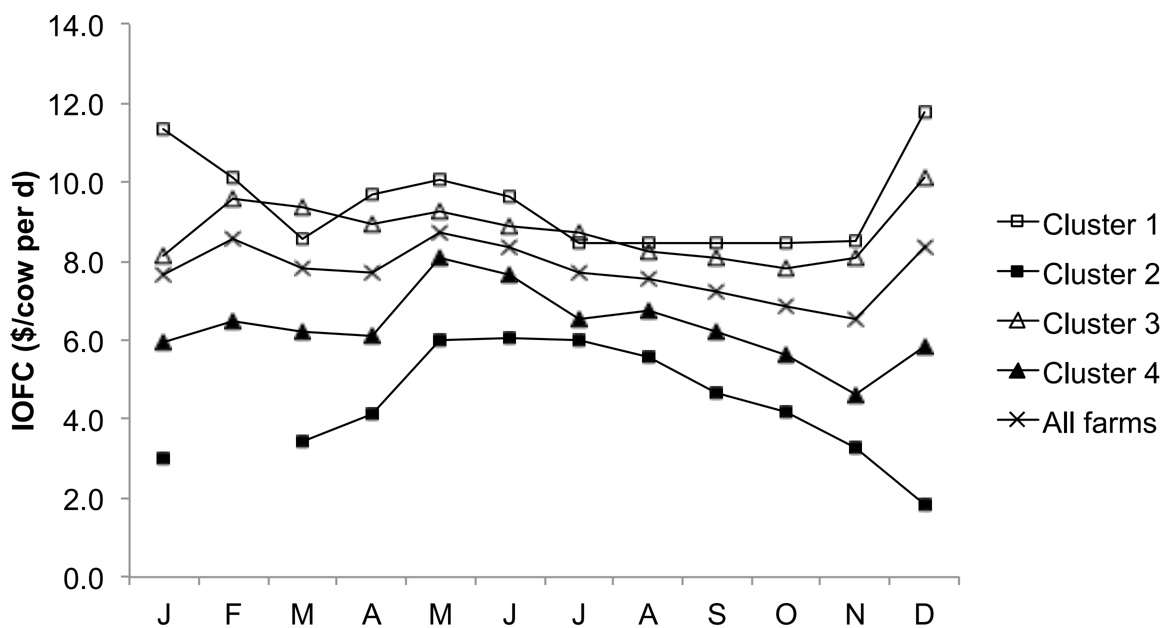
	Cluster 1 (n=8)		Cluster 2 (n=5)		Cluster 3 (n=32)		Cluster 4 (n=24)		Total (n=69)	
Variables	mdn[1]	(iqr)[1]	mdn	(iqr)	mdn	(iqr)	mdn	(iqr)	mdn	(iqr)
RHA[2] (kg/cow per yr)	6,878[a]	(1,038)	3,632[c]	(783)	7,457[a]	(1,754)	5,417[b]	(1,760)	6,583	(2,520)
IOFC[3] ($/cow per d)	10.17[a]	(2.99)	5.76[ab]	(1.62)	8.59[a]	(4.68)	5.92[b]	(2.47)	7.73	(4.01)

[1]mdn = median, iqr = interquartile range

[2]Milk rolling herd average (RHA)

[3]Milk income over feed costs (IOFC) for lactating cows for January – November 2010. Cluster 2: n = 4, Cluster 3: n = 25, Cluster 4: n = 20.

[abc]Kruskal-Wallis test ($P \leq 0.05$). Medians within a row not sharing a common superscript are statistically different based on Wilcoxon test with Bonferroni correction ($P < 0.05$).



Cabrera, V. E. *2014. Economics of fertility in high-yielding dairy cows on confined TMR systems.* ***Animal 8:211-221****.*

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

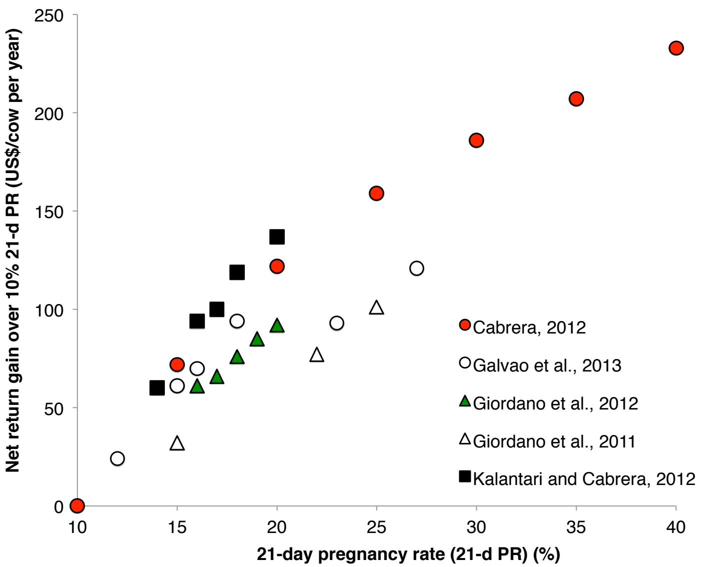
Cabrera, 2012:
Markov-Chain, DSS

Kalantari and Cabrera, 2012:
Markov-Chain, DSS

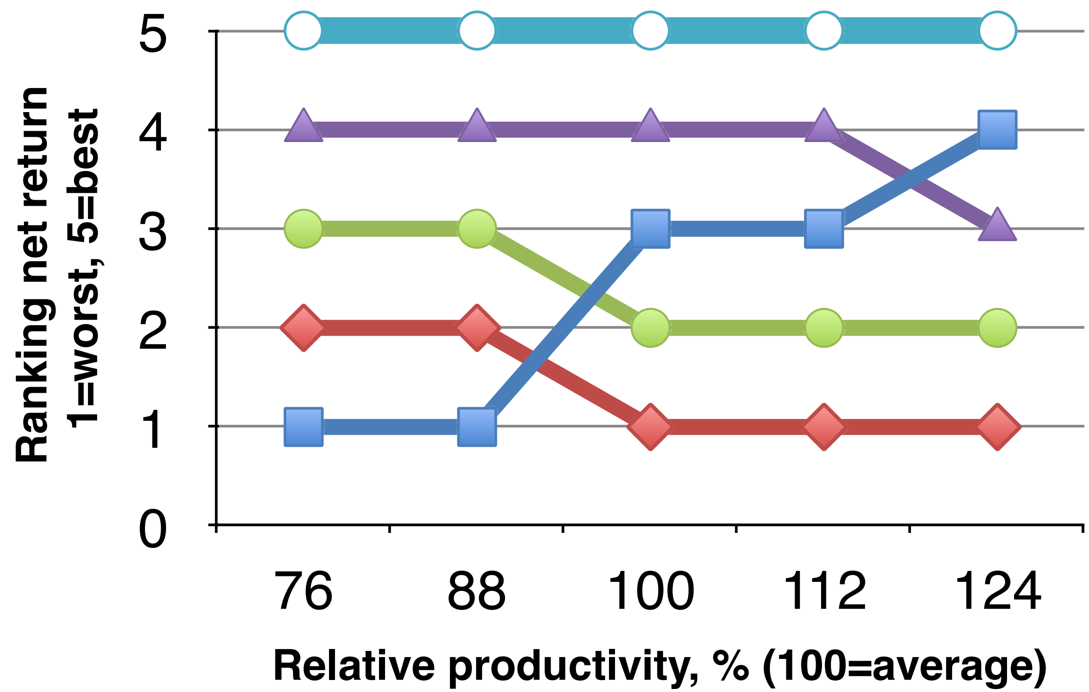
Giordano et al., 2013:
Decision theory

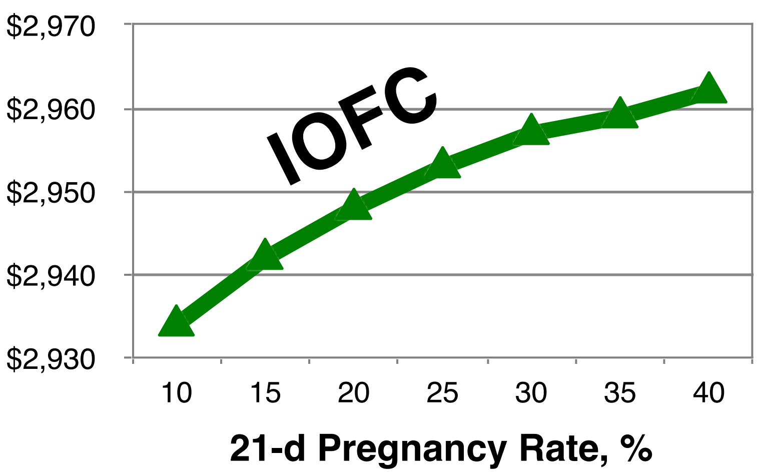
Galvao et al., 2013:
Monte Carlo

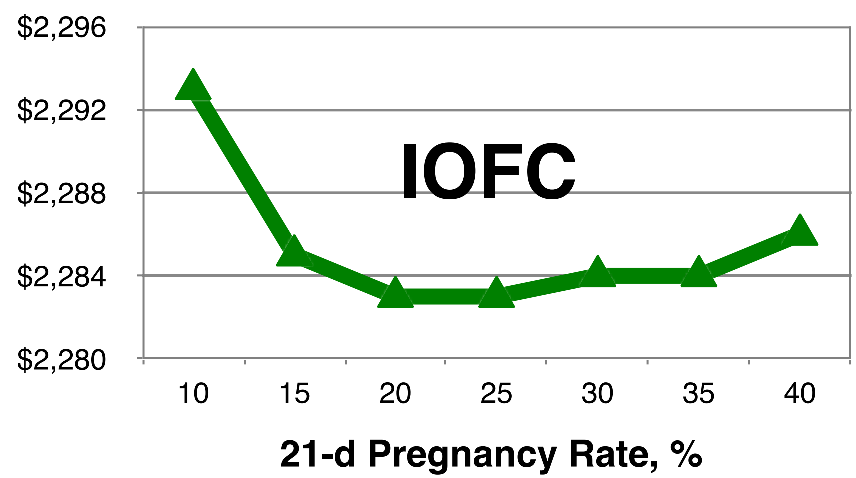
Cabrera, V. E. *2014. Economics of fertility in high-yielding dairy cows on confined TMR systems.* ***Animal 8:211-221****.*



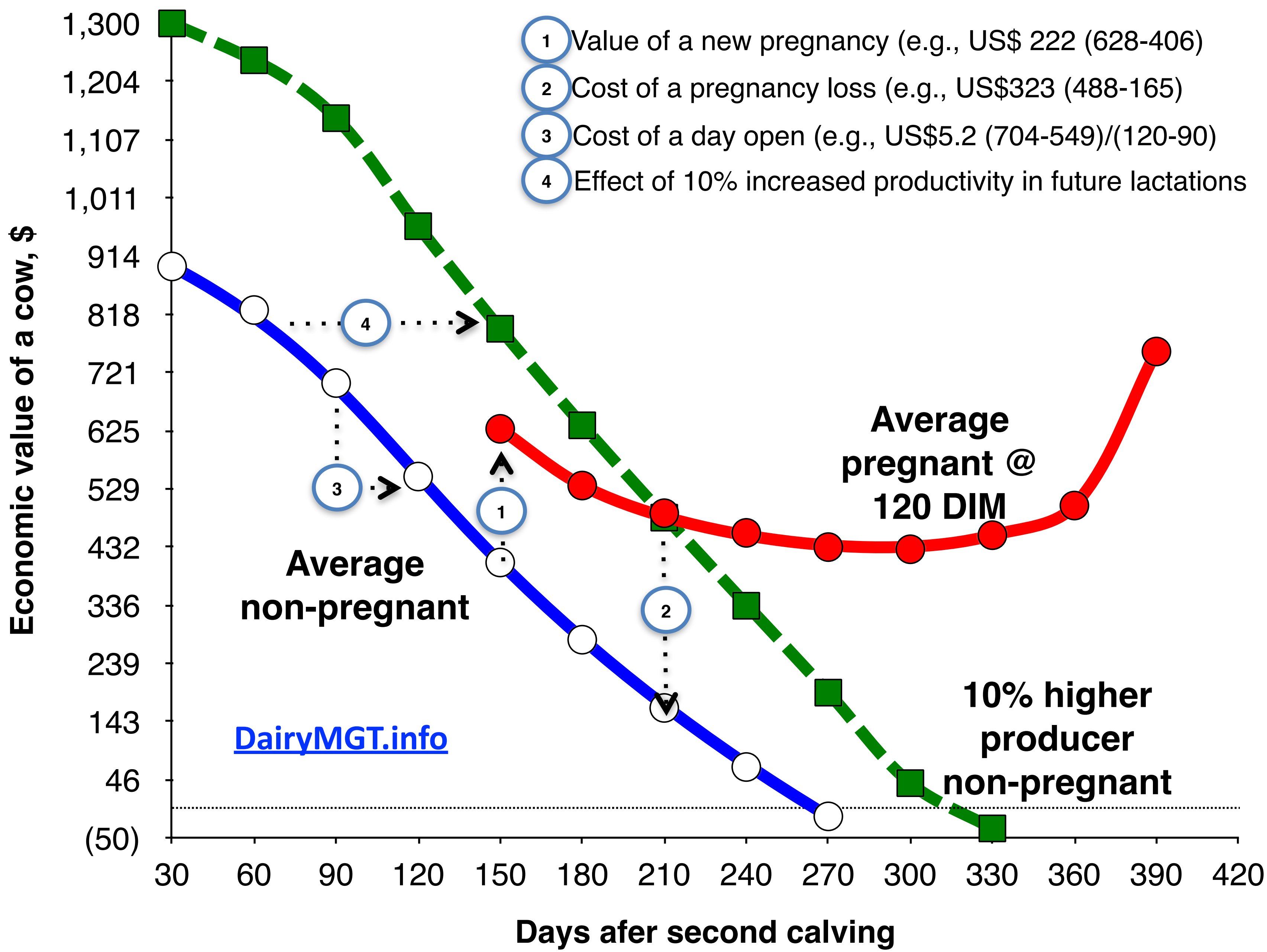
Kalantari and Cabrera, 2012







*Shahinfar, S, A. Kalantari, **V. E. Cabrera**, K. Weigel. 2014. Short communication: Prediction of retention pay-off using a Machine Learning algorithm. **Journal of Dairy Science 97:2949-2952**.*



*Shahinfar, S, A. Kalantari, **V. E. Cabrera**, K. Weigel. 2014. Short communication: Prediction of retention pay-off using a Machine Learning algorithm. **Journal of Dairy Science 97:2949-2952**.*

Retention Pay-Off (RPO) Calculator

Saleh Shahinfar, Afshin Kalantari, V.E. Cabrera, and K.A. Weigel, Department of Dairy Science

Overview | RPO Calculator

Overview

Retention pay-off (RPO) is the expected profit from keeping a cow compared with immediate replacement. This value could be used to rank animals and help farmers make replacement decisions. Normally, cows with positive RPO should be kept and cows with negative RPO should be replaced to maximize long-term profitability of the herd. Values of RPO are normally calculated by optimizing replacement policies through dynamic programming. This RPO-calculator is a machine learning tool that is trained on 122,716 possible cow states and herd parameters solved by dynamic programming. Individual cows in the model are described by Lactation, Days in Milk, Days in Pregnancy, ME305. Herds are described by parameters such as milk production replacement cost, and milk price. The user should provide these cow and herd specific parameters for the tool to calculate RPO for each individual cow.

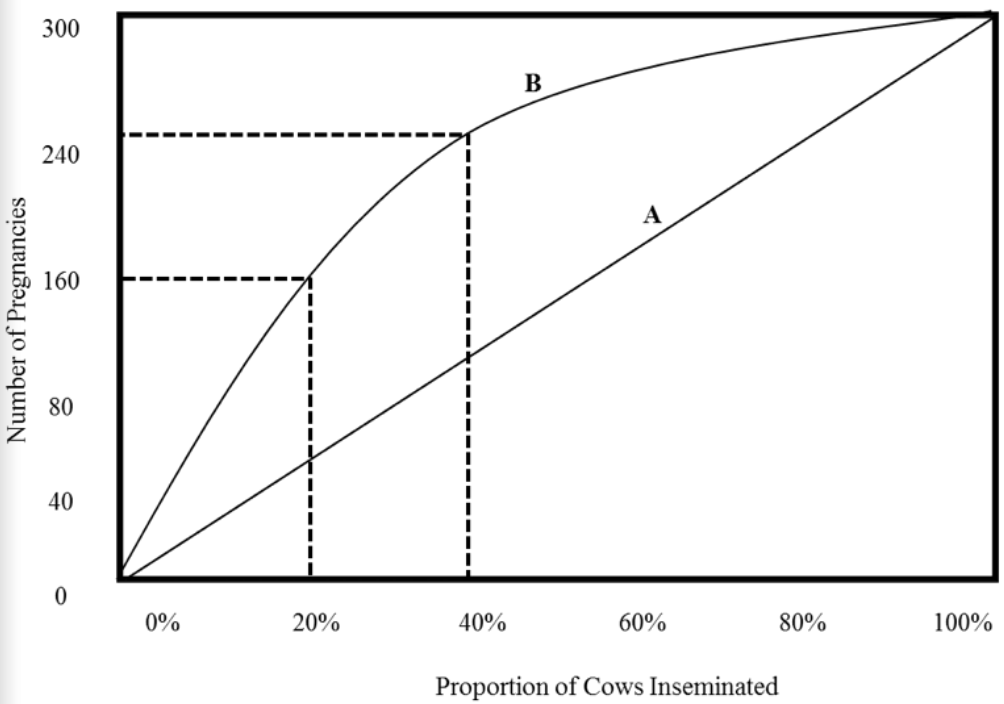
Milk price and replacement cost are categorized in 3 tiers. For milk ($/cwt) these are: <14 (tier 1), 14 to 18 (tier 2), and >18 (tier 3). For replacement cost ($) these are: <1,100 (tier 1), 1,100-1,500 (tier 2), and >1,500 (tier 3).

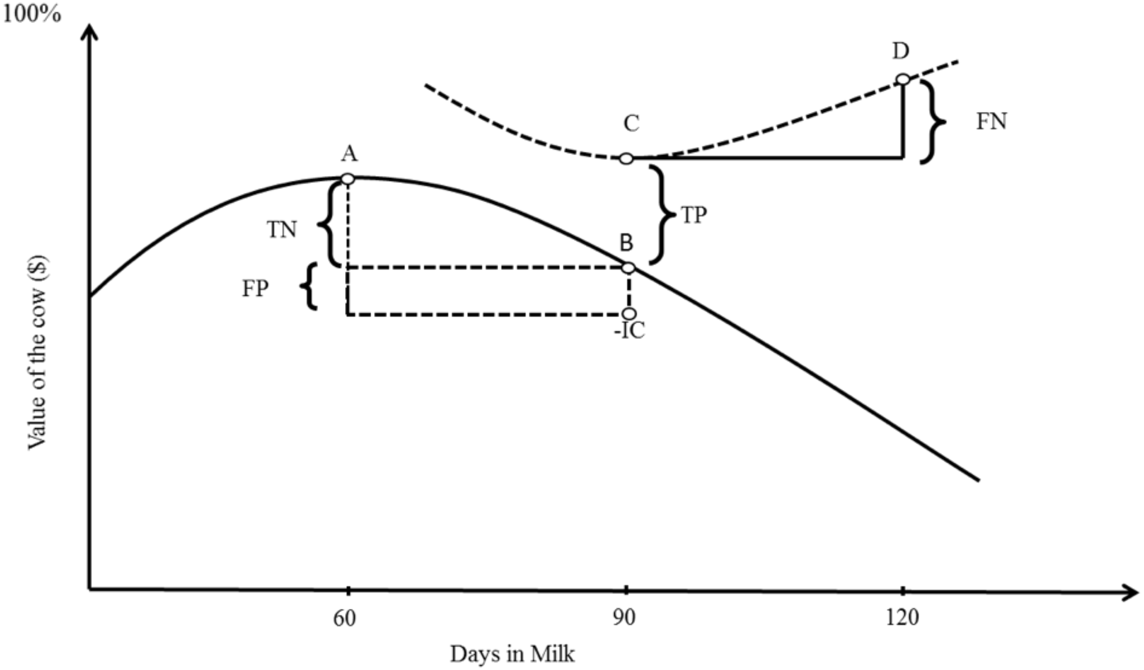
Acknowledgement

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

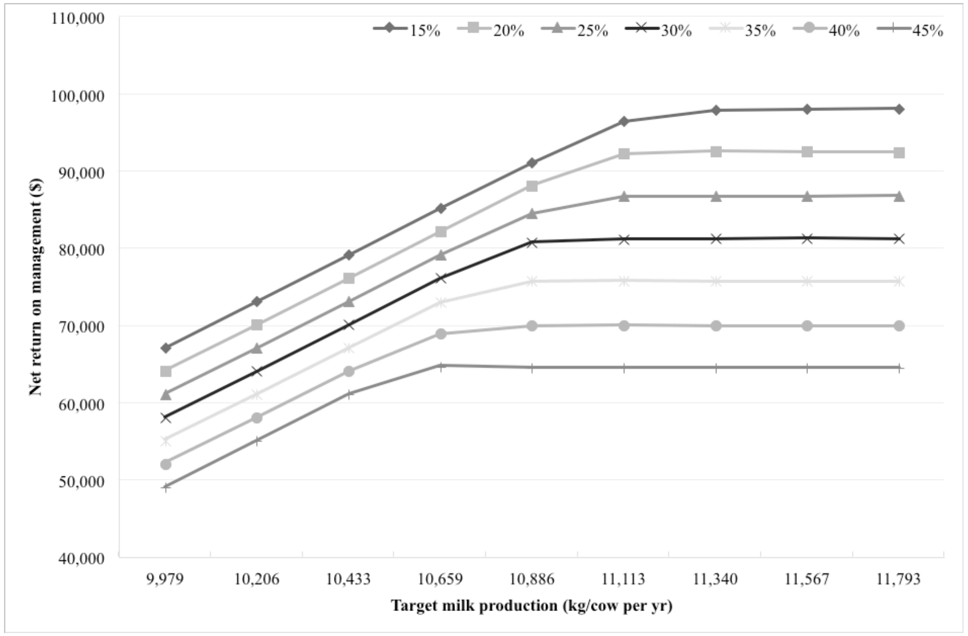
This project is supported by US Department of Agriculture Hatch project to V.E. Cabrera WIS01577.

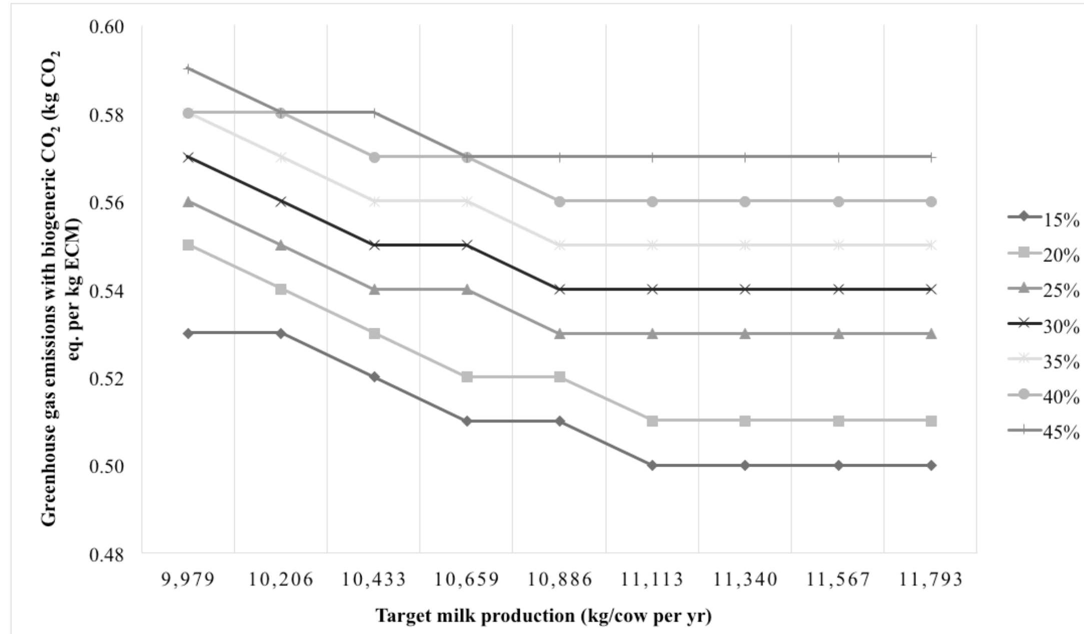
Shahinfar, S., J. N. Guenther, D. Page, A. Samia-Kalantari, ***V. E. Cabrera.*** *P. M. Fricke, and K. A. Weigel. 2014. Optimization of reproductive management programs using lift chart analysis and cost sensitive evaluation of classification errors.* ***Animal Science 92 (E-Suppl. 2):576.***

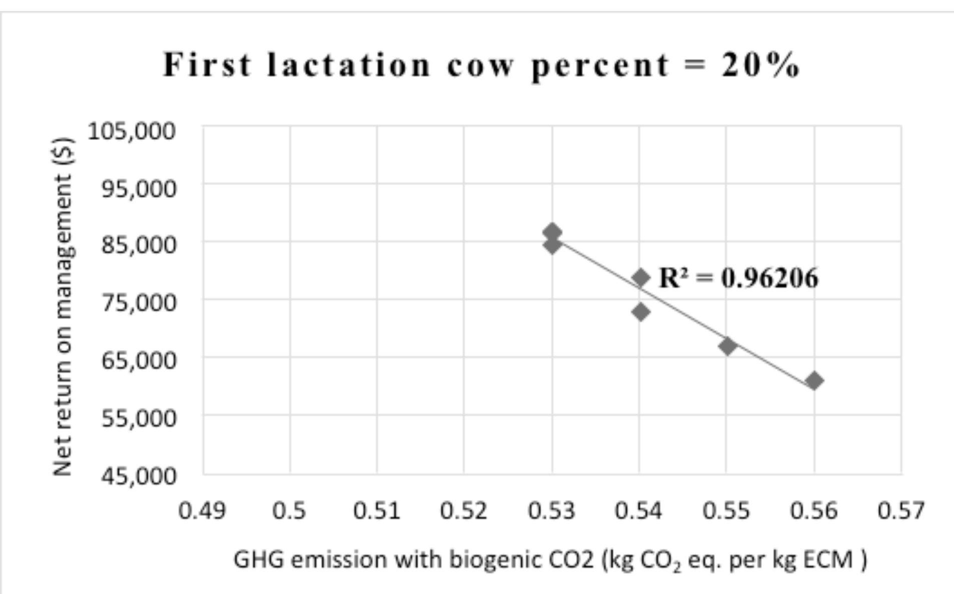


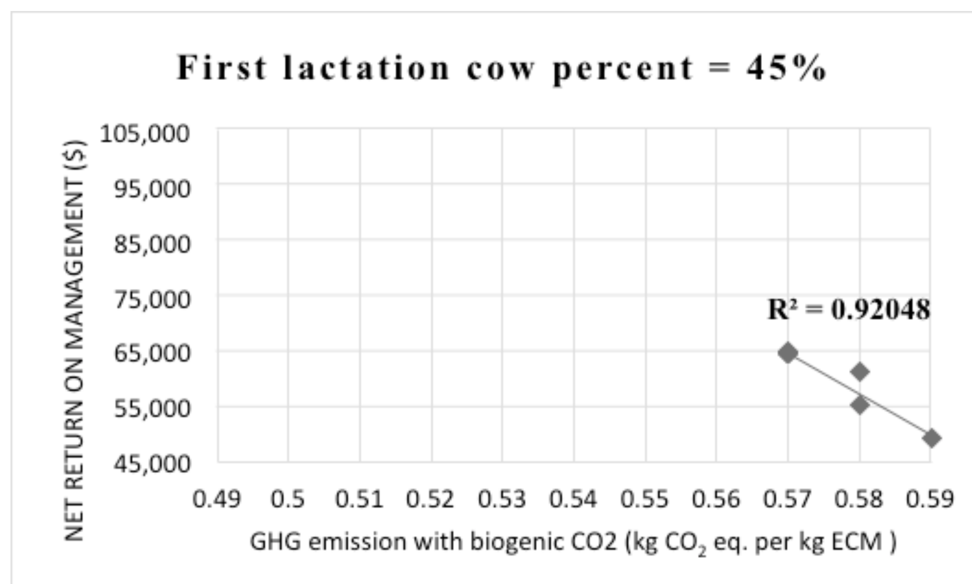


Liang, D., and ***V. E. Cabrera****. 2014. Optimizing concurrently dairy farm productivity and environmental performance.* ***Animal Science 92 (E-Suppl. 2):571****.*









*Lopes, G., and, **V. E. Cabrera**. 2014. Premium beef semen on dairy calculator. J**ournal of Animal Science 92 (E-Suppl. 2):288**.*

Premium Beef on Dairy Program

V.E. Cabrera, UW-Madison Dairy Science and **G. Lopes**, Accelerated Genetics

Overview | Analysis

Number of adult cows	1000
Current herd turnover ratio, %	30
Current adult herd 21-d pregnancy rate, %	15
Female calvings required 9 months from now	316
Current heifer conception rate at 1st service, %	55
Current heifer services with sexed semen	0
Stillbirth + calf mortality, %	5

		# Animals Eligible for Service		Conception Rate by Semen Type			Selection and Semen Type	
							Top	Bottom
Collapse	Service	Projected	Adjusted	C, %	S, %	B, %	80	20
Heifers	1st	470		60	48	50	S	S
	2nd	211		45	36	45	S	S
	3rd	95		40	32	40	S	B
	>3rd	43		35	28	35	S	B
Lactation 1	1st	29		40	32	35	C	B
	2nd	23		35	28	33	C	B
	3rd	18		30	24	31	C	B
	>3rd	104		25	20	30	C	B
Lactation 2	1st	19		35	28	30	C	B
	2nd	14		33	26	28	C	B
	3rd	11		30	24	27	C	B
	>3rd	51		25	20	26	C	B
Lactation >2	1st	21		33	26	27	C	B
	2nd	16		30	24	26	C	B
	3rd	12		27	22	25	C	B
	>3rd	49		25	20	24	C	B

	C	S	B
Females, % by semen	47	90	0
Semen Cost, $/unit			
Eartag cost, $/unit	0.5	0.5	3

Thanks

DairyMGT.info