

# Reproductive Management of Dairy Heifers

**Paul M. Fricke, PhD**

Associate Professor  
Department of Dairy Science  
University of Wisconsin - Madison



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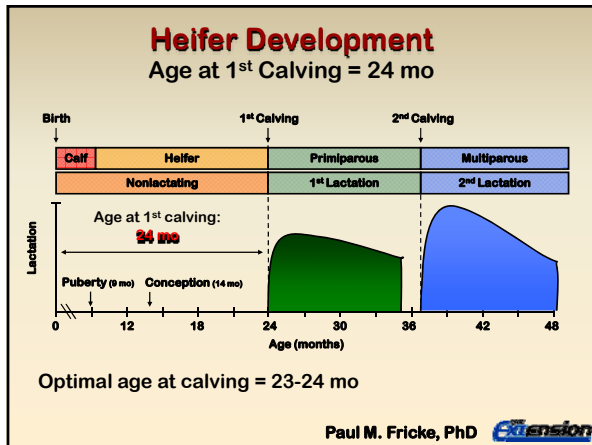
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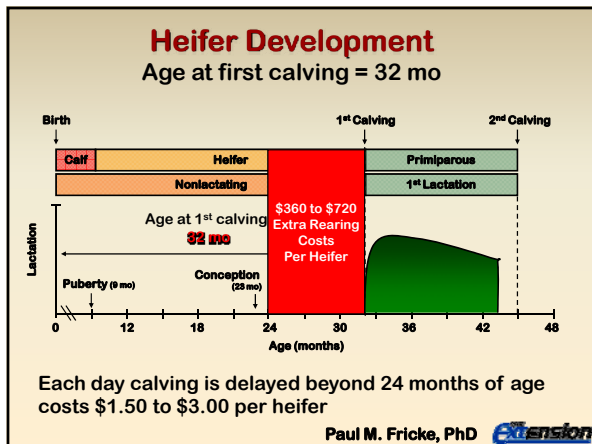
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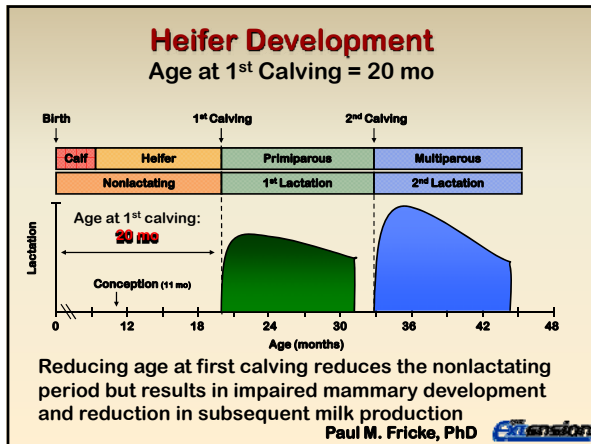
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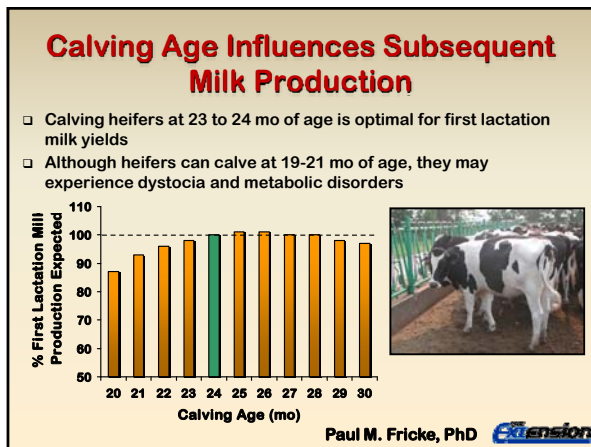
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### Deciding When to Breed Holstein Heifers

#### Breeding Recommendations

Age = 13 months  
 Weight = 875 lb (396 kg)  
 Withers Height = 50 in (127 cm)

#### Calving Recommendations

Age at first calving = 22 - 24 months  
 Weight = 1250 lb (567 kg) post-calving  
 Withers Height = 55 in (140 cm)




Figure 16.2 Heifers should be bred when they reach 66 percent of their mature weight or height. For Holsteins, this is typically 875 pounds or 50 inches.

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## Heifer Reproductive Efficiency

### Poor Reproduction

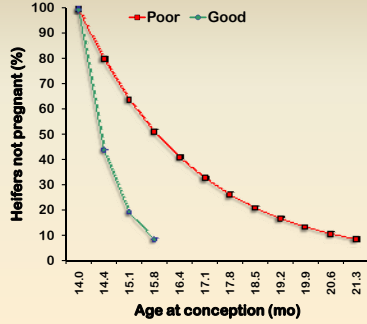
SR=50%; CR=40%

Average Age:  
At 1<sup>st</sup> breeding = 14.0  
At conception = 16.4  
At 1<sup>st</sup> calving = 25.7

### Good Reproduction

SR=80%; CR=70%

Average Age:  
At 1<sup>st</sup> breeding = 14.0  
At conception = 14.7  
At 1<sup>st</sup> calving = 24.0



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## Lactating Cows vs. Heifers



What is "normal" for conception rate?

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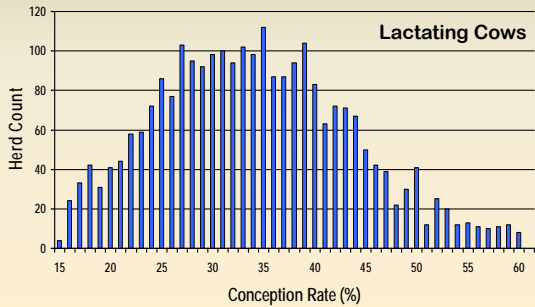
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## Conception Rate, 1998 Minnesota DHI Data

Rapnicki P, Stewart S, Eicker S. 2001. Proc 4-State Appl Nutr Mgt Conf, La Crosse, WI



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## Reproductive Management Protocols for Dairy Heifers



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## Radiotelemetry

HeatWatch®



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## Behavioral Estrus in Holstein Dairy Cattle Based on HeatWatch

	Lactating Cows	Nonlactating Heifers
n	307	114
Standing Events	7.2 ± 7.2	16.8 ± 12.8
Duration of Estrus (h)	7.3 ± 7.2	11.3 ± 6.9

J Dairy Sci 80(Suppl. 1):179; 1997

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## Hormonal Manipulation of Ovarian Function in Heifers

CIDR Inserts  
GnRH  
Prostaglandin F<sub>2α</sub>



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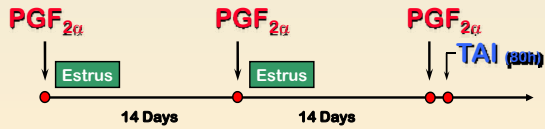
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## PGF Synchronization Protocols (Targeted Breeding System)

Treat all heifers and AI those detected in estrus.  
Retreat remaining heifers after 14 days and AI those detected in estrus.



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## Ovsynch



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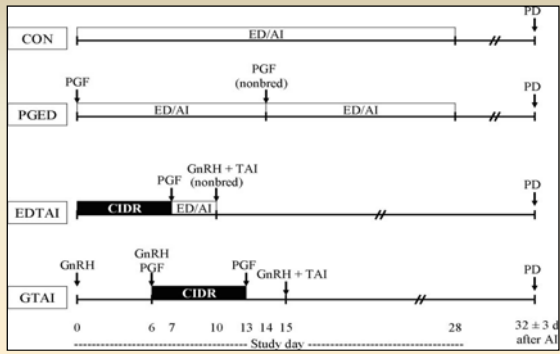
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**Stevenson et al., J. Dairy Sci. 91:3424; 2008**



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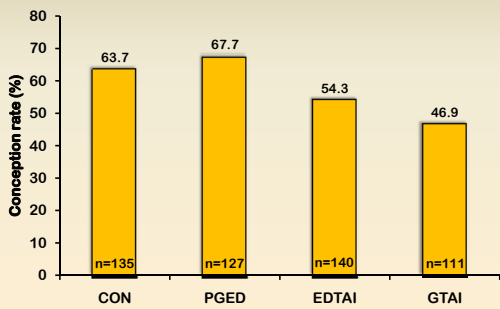
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**Effect of Treatment on Conception Rate in Dairy Heifers**  
Stevenson et al., J. Dairy Sci. 91:3424; 2008



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**Cost Analysis Inputs**

Stevenson et al., J. Dairy Sci. 91:3424; 2008

Item	Cost (\$)	Range (\$)	Increment (\$)
GnRH per dose	1.65	1.50 – 4.50	0.50
PGF <sub>2α</sub> per dose	2.50	1.50 – 4.50	0.50
CIDR insert	8.00	5.50 – 10.50	1.00
Labor per hour	10.00	6.50 – 18.50	2.00
Rearing cost (heifer/d)	1.65	0.75 – 2.25	0.25

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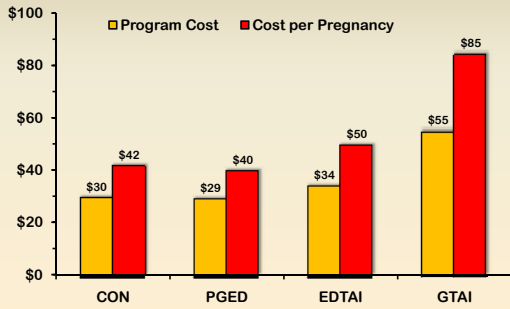
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### Cost Analysis

Stevenson et al., J. Dairy Sci. 91:3424; 2008



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### Synchronization Systems

Fricke et al., 2003

**Resynch Ovsynch**  
Pursley & Wiltbank, 1995

**Presynch**

Moreira et al., 2001

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### Conception rates after AI to estrus or Ovsynch and timed AI – Heifers vs. Cows

	Study	n	Conception (%)	
			Control	Ovsynch
Lactating Cows	1	546	42	39
Lactating Cows	2	311	39	39
Virgin Heifers	2	155	74	35*

\*Differs from Control, P < 0.01

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## Connie Cordoba



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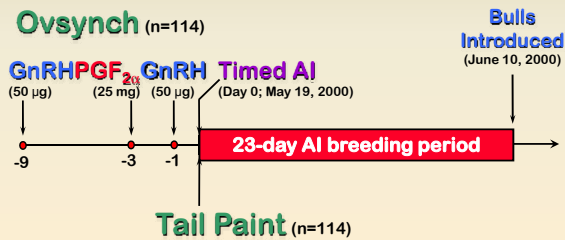
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## Experimental Design

Lactating Cows – Grazing System



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## Reproductive Performance

1<sup>st</sup> AI service Cordoba & Fricke, J. Dairy Sci. 85:1752-1763; 2002

Item	Ovsynch	Tail Paint
Method of AI	Timed AI	AI at estrus
AI submission rate (%)	100.0 <sup>a</sup> (114/114)	84.2 <sup>b</sup> (96/114)
Mean d of AI	0.0	12.0 ± 0.6
Conception rate (%)	27.3 <sup>a</sup> (30/110)	47.3 <sup>b</sup> (43/91)

<sup>a,b</sup>Within a row, percentages with different superscripts differ (p<0.01)

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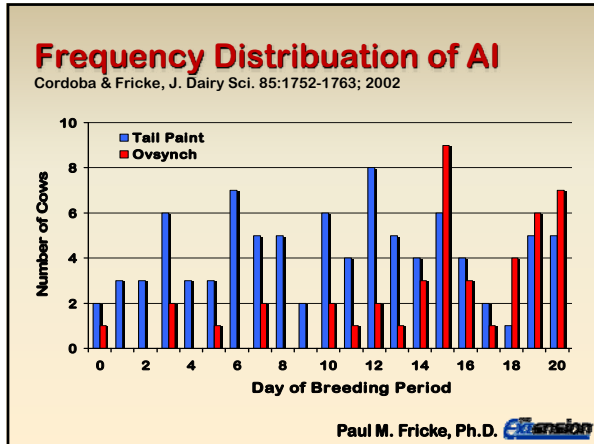
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### Ovsynch cows with low P<sub>4</sub> at 2<sup>nd</sup> GnRH

Cordoba & Fricke, J. Dairy Sci. 85:1752-1763; 2002

P <sub>4</sub> -class	n	Anovular % (no)	CR % (no)	Return to AI % (no)
LLL	5	80.0 (4)	0.0 (0)	60.0 (3)
HLL	28	0.0 (0)	<b>14.3<sup>a</sup></b> (4)	71.4 (20)
LHL	33	24.2 (8)	<b>39.4<sup>b</sup></b> (13)	27.3 (9)
HHL	23	0.0 (0)	<b>43.5<sup>b</sup></b> (10)	30.4 (7)
<b>Σ</b>	<b>89</b>	<b>13.5</b> (12)	<b>30.3</b> (27)	<b>43.8</b> (39)

<sup>a,b</sup>Different superscripts denote significant contrasts (p<0.05)

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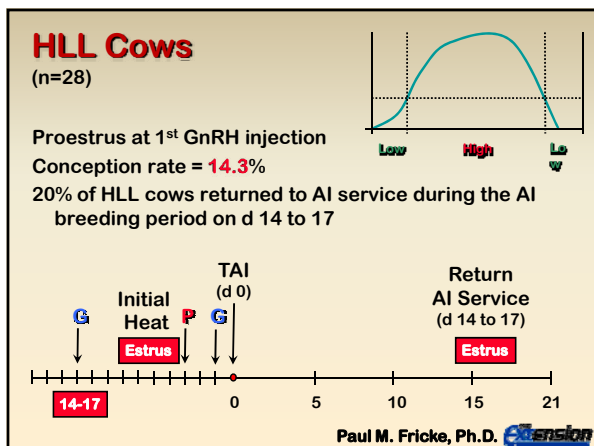
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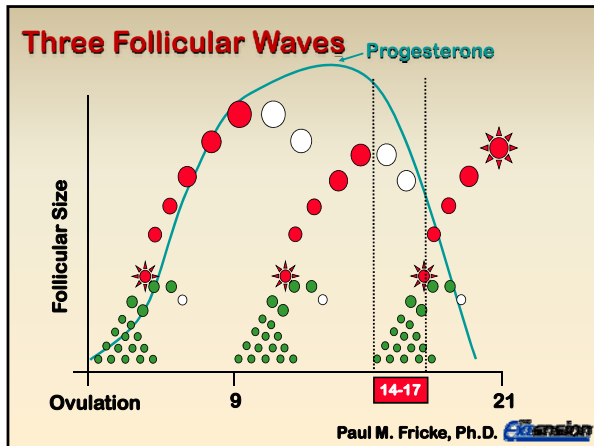
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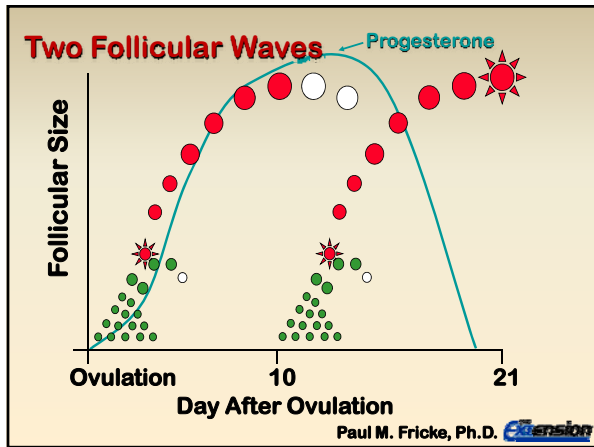
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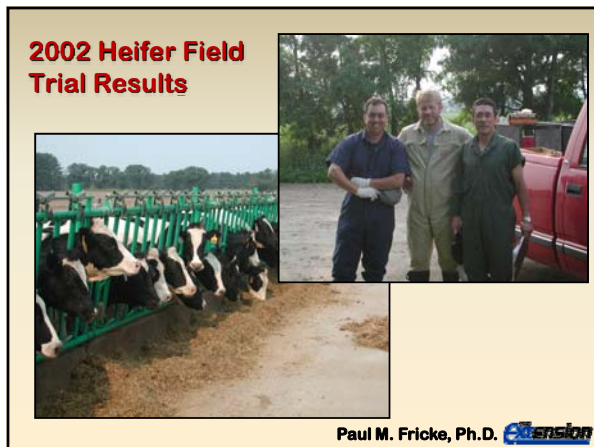
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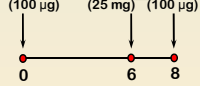
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## Experimental Design

Nonlactating Holstein dairy heifers

### GPG + Tail Chalk (n=175)

GnRH (100 µg) PGF<sub>2</sub> (25 mg) GnRH + TAI (100 µg)



Once-daily estrus detection and AI based on tail chalk

42-day AI breeding period

### Tail Chalk (n=170)

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## Effect of GPG vs. Tail Chalk

Rivera et al., J. Dairy Sci. 87:2051; 2004

Treatment	n	Interval to 1 <sup>st</sup> AI (d)			CR % (no.)
		Mean	Min	Max	
GPG	175	7.5 <sup>*</sup> ± 0.1	1	8	38.3 (67)
TAI	144 (82%)	8.0 ± 0.0	8	8	38.2 (55)
Estrus before TAI	31 (18%)	5.2 ± 0.2	1	7	38.7 (12)
Tail Chalk	172	9.9 ± 0.5	0	38	46.5 (80)
Overall	347	7.6 ± 0.3	0	38	40.0 (138)

\*Differs from Tail Chalk (p<0.01).

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## Four Factors Influence Conception Rate:

$$PR/AI =$$

Female

Fertility × Bull

Fertility × Accuracy

of Heats × AI

Efficiency

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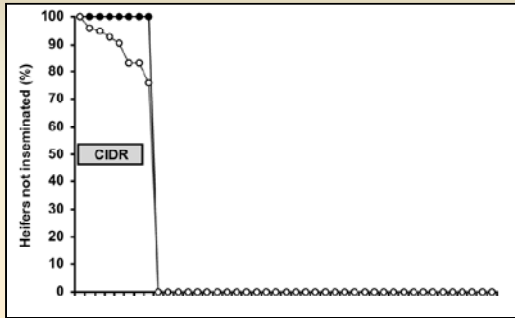
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## Survival to first service

Rivera et al., J. Dairy Sci. 88:957; 2005



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## Effect of GPG vs. GPG + CIDR

Rivera et al., J. Dairy Sci. 88:957; 2005

Item	Treatment	
	GPG	GPG + CIDR
AI to estrus before TAI	23.9 (23/96)	0.0 (0/94)
Heifers receiving TAI	76.0 (73/96)	100.0 (94/94)
CR (30 d) to estrus	26.1 (6/23)	-
CR (30 d) to TAI	29.1 (28/96)	31.9 (30/94)

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## Effect of AI technician

Rivera et al., J. Dairy Sci. 88:957; 2005

Treatment	Technician		
	1	2	3
	% (no./no.)	% (no./no.)	% (no./no.)
GPG	8.0 (2/25)	8.3 (2/24)	51.1 (24/47)
GPG + CIDR	13.6 (3/22)	0.0 (0/24)	56.2 (27/48)
Overall	10.6 <sup>a</sup> (5/47)	4.2 <sup>a</sup> (2/48)	53.7 <sup>b</sup> (51/95)

<sup>a,b</sup>Within a row, percentages with different superscripts differ

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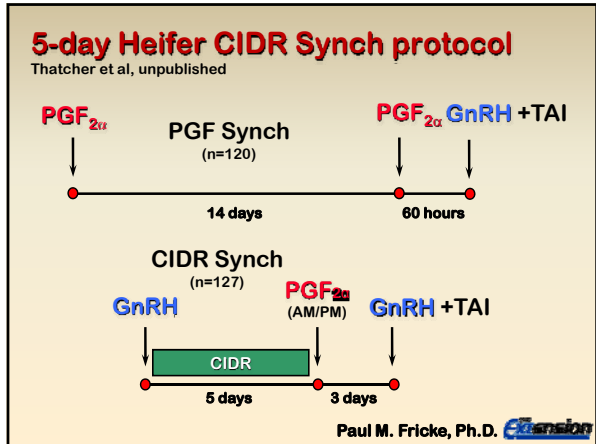
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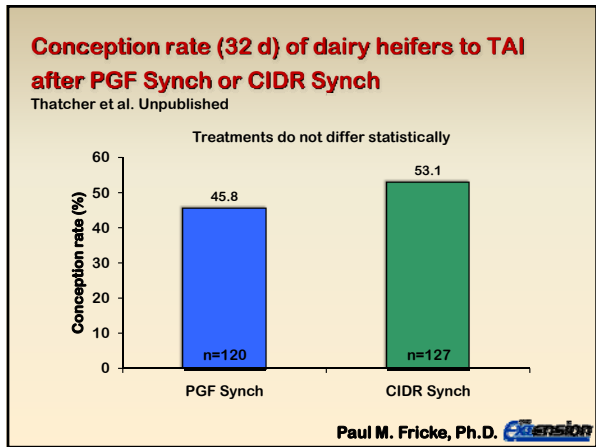
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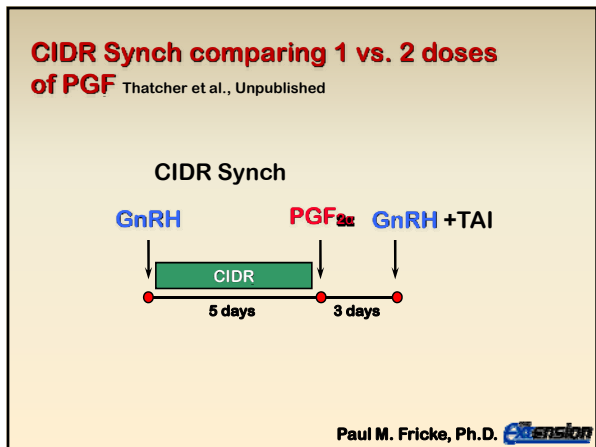
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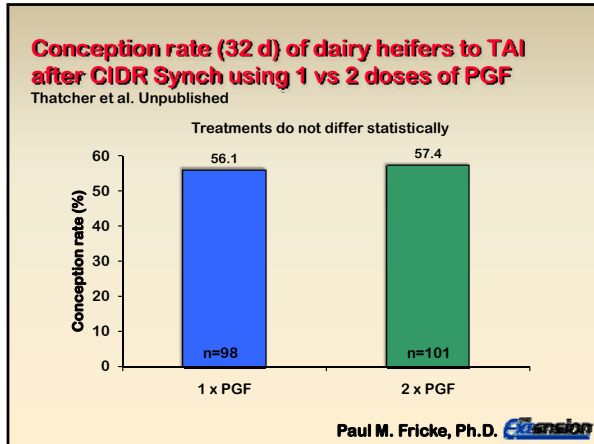
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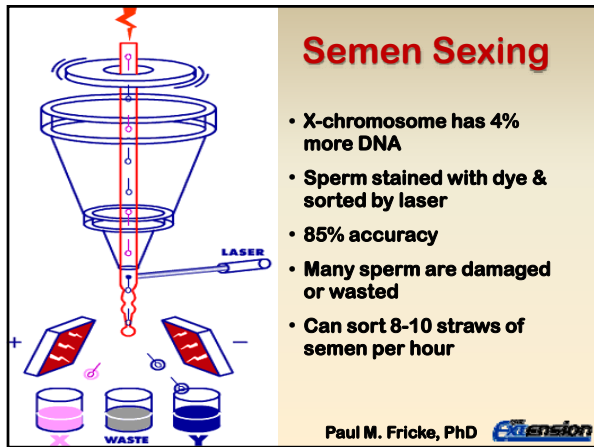
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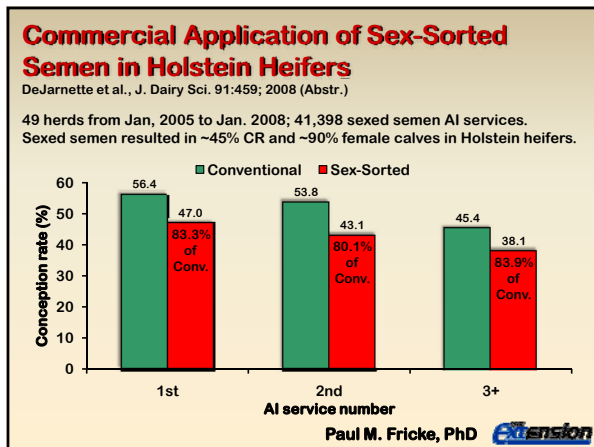
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# Use of Sexed Semen on Wisconsin Dairy Farms

Ryan Sterry, UW-Extension Polk County  
 Denise Brusveen, UW-Extension Sauk County  
 Kent Weigel, Department of Dairy Science, UW-Madison  
 Paul Fricke, Department of Dairy Science, UW-Madison



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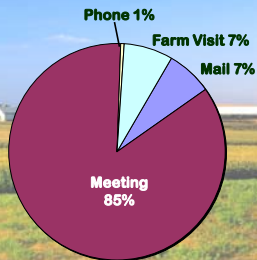
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## Survey Administration

- Conducted Winter '07-'08
- Administered by UW-Extension county faculty
- 20 questions
- Three general response categories
  - Never used
  - Used, but not currently
  - Currently using
- 347 responses (307 Dairy, 38 Heifer Growers)

How was survey distributed?



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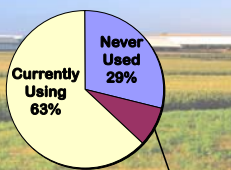
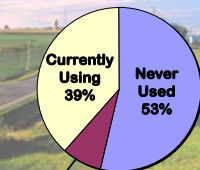
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## Experience with Sexed Semen

Dairy Farms (n=309)

Heifer Growers (n=38)



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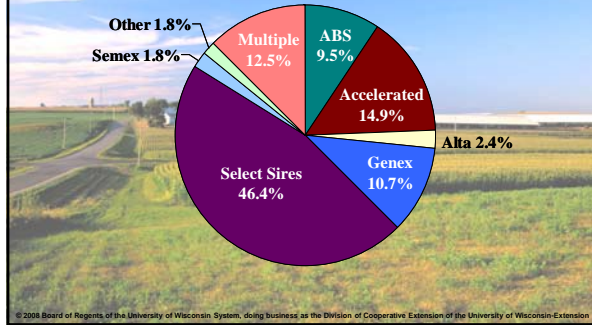
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### Source of Sexed Semen (n=168)




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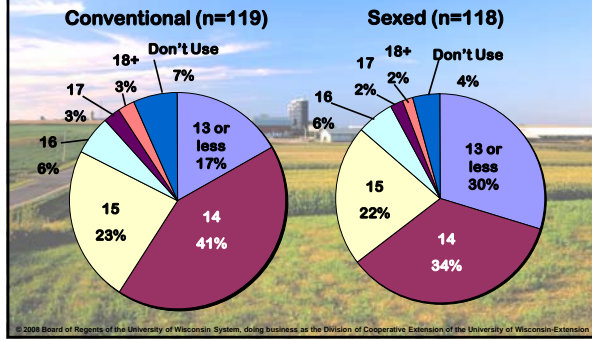
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### Age of Heifers at First Breeding - Only Beltsville




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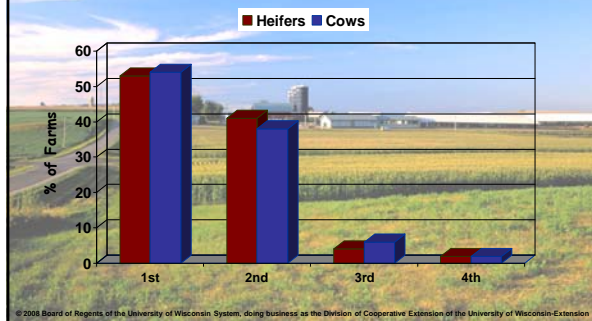
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### Services for Using Sexed Semen - Beltsville




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**On the Web:**

[www.uwex.edu/ces/dairymgt/](http://www.uwex.edu/ces/dairymgt/)  
[www.uwex.edu/ces/dairyrepro/](http://www.uwex.edu/ces/dairyrepro/)



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 University of Wisconsin - Madison

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