Ottimizzare la gestione riproduttiva in vacche ad alta produzione

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J. Dairy Sci. 105:4679–4689
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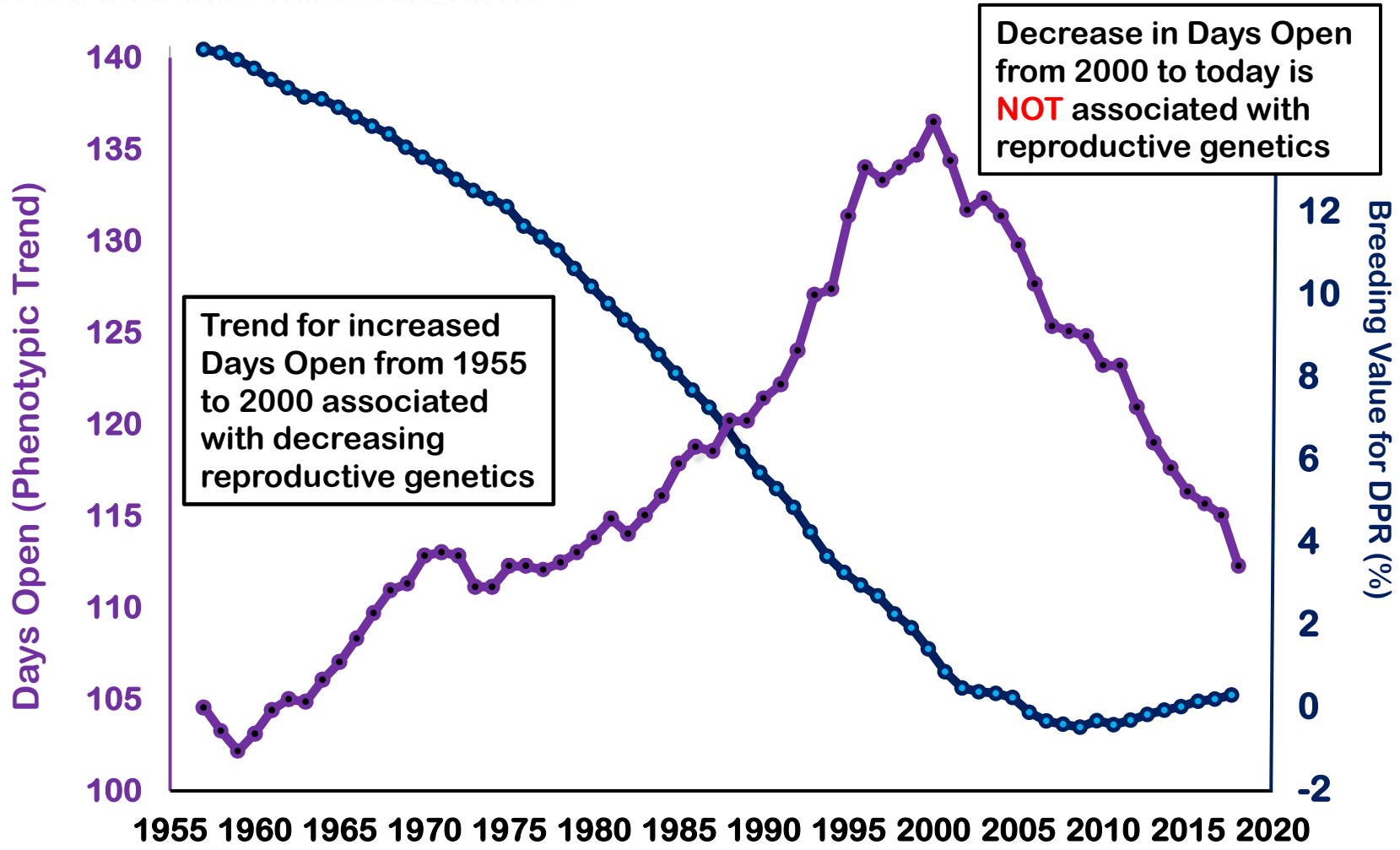
Symposium review: The implications of spontaneous versus synchronized ovulations on the reproductive performance of lactating dairy cows*

P. M. Fricke† and M. C. Wiltbank
Department of Animal and Dairy Sciences, University of Wisconsin-Madison, Madison 53706

CDCB
COUNCIL ON DAIRY CATTLE BREEDING



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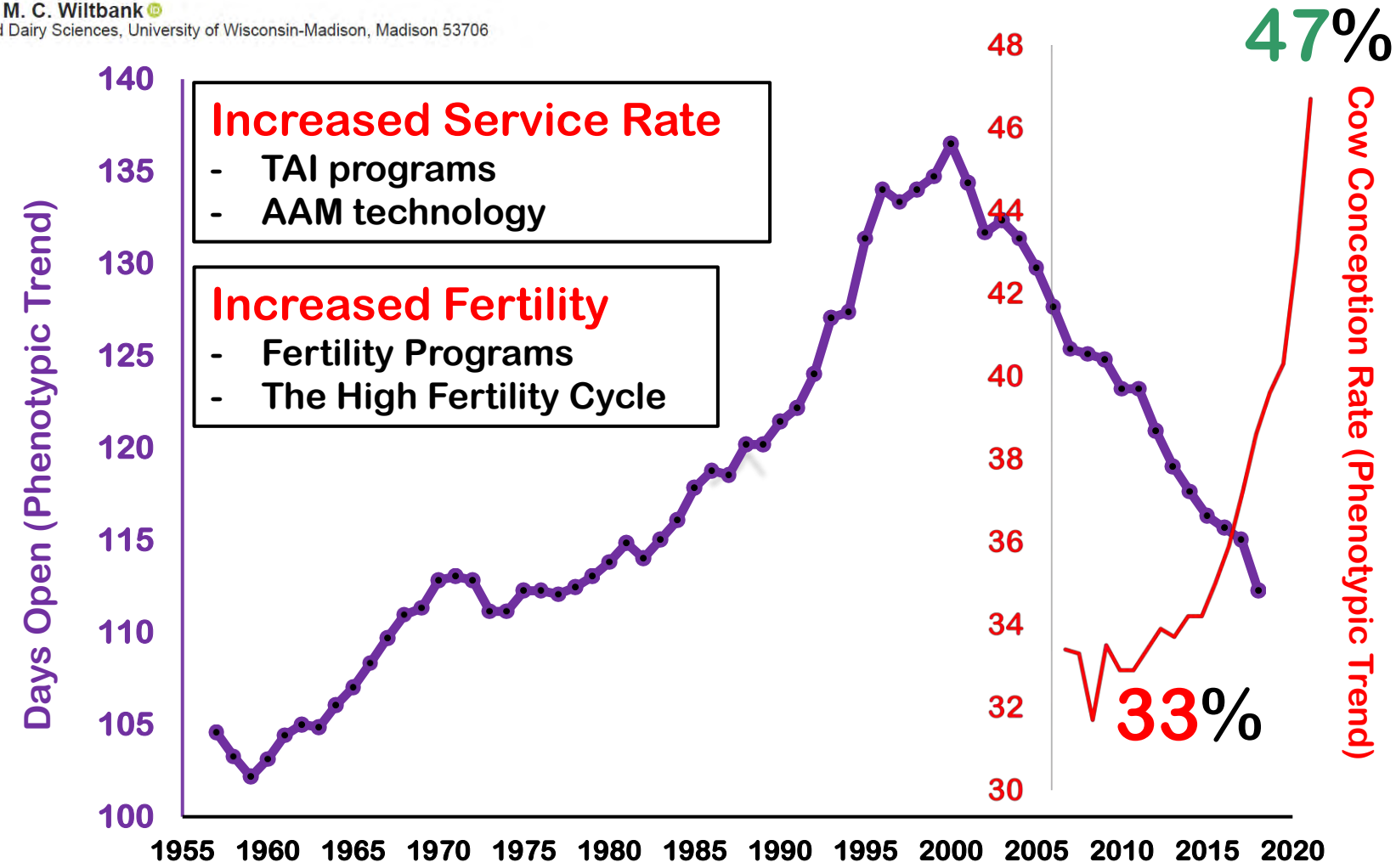

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Agenda

1. Periodo di transizione (dry and post-partum)
2. Efficienza riproduttiva
   - ✓ Periodo di attesa volontario (VWP)
   - ✓ Gestione della 1° FA
   - ✓ Resynch
3. Perdita di gravidanza e tasso di aborti
4. Conclusioni

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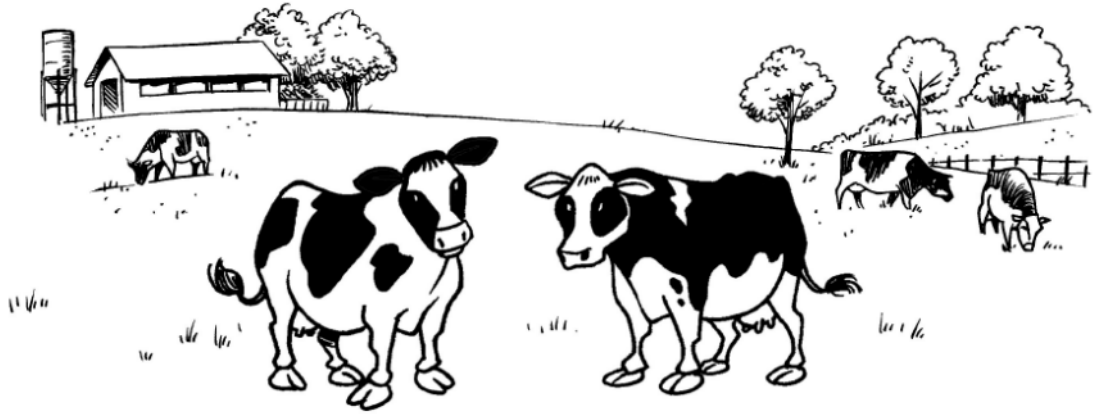
Obiettivi Periodo di Transizione

- ✓ Massimizzare la produzione di latte
- ✓ Ridurre l'incidenza delle patologie of post-partum
- ✓ Ottimizzare l'efficienza riproduttiva
- ✓Dare la nascita ad una vitella sana



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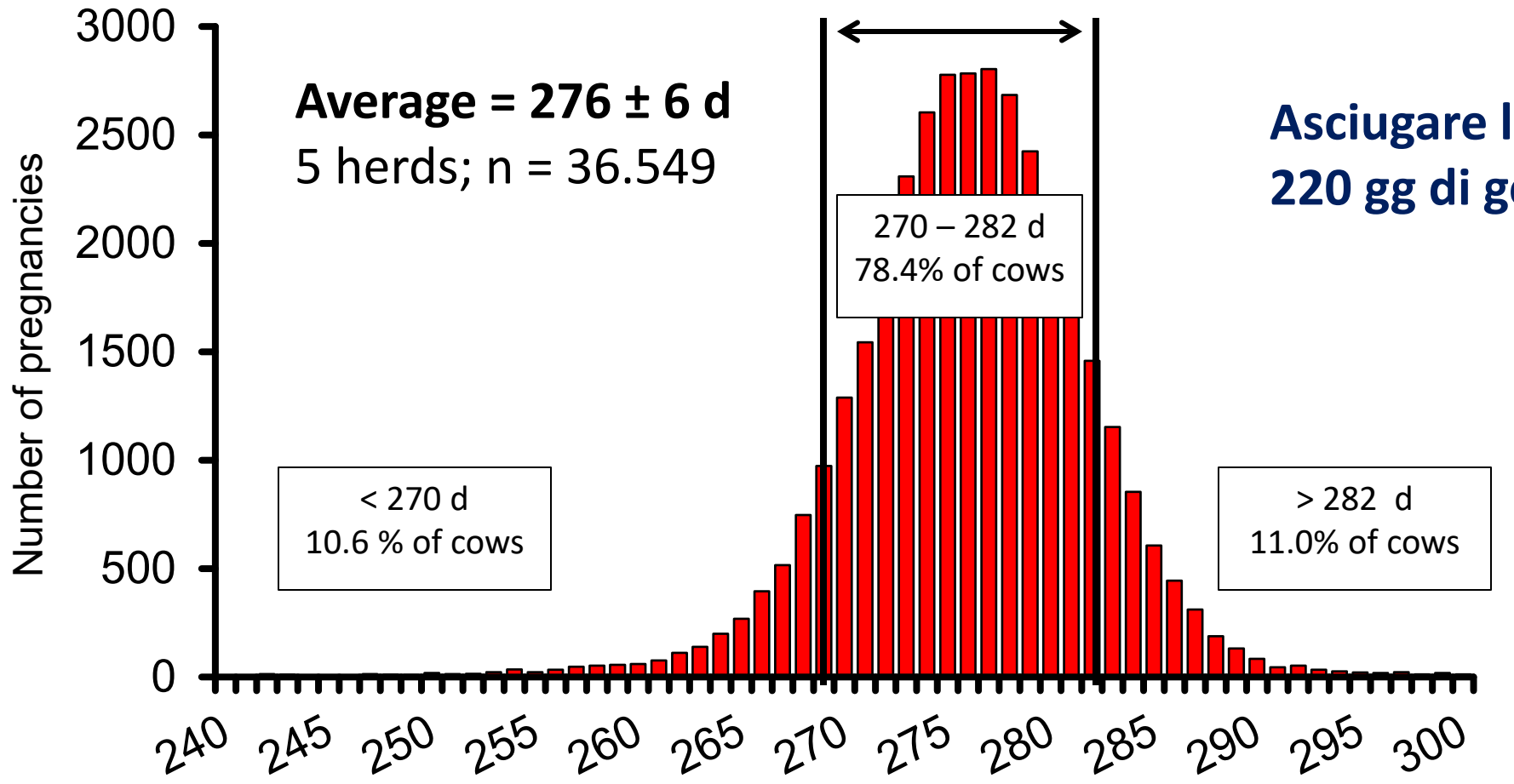
Quando asciugare le vacche?



Asciugare la vacche a 220 gg di gestazione!

Santos, VG.2015

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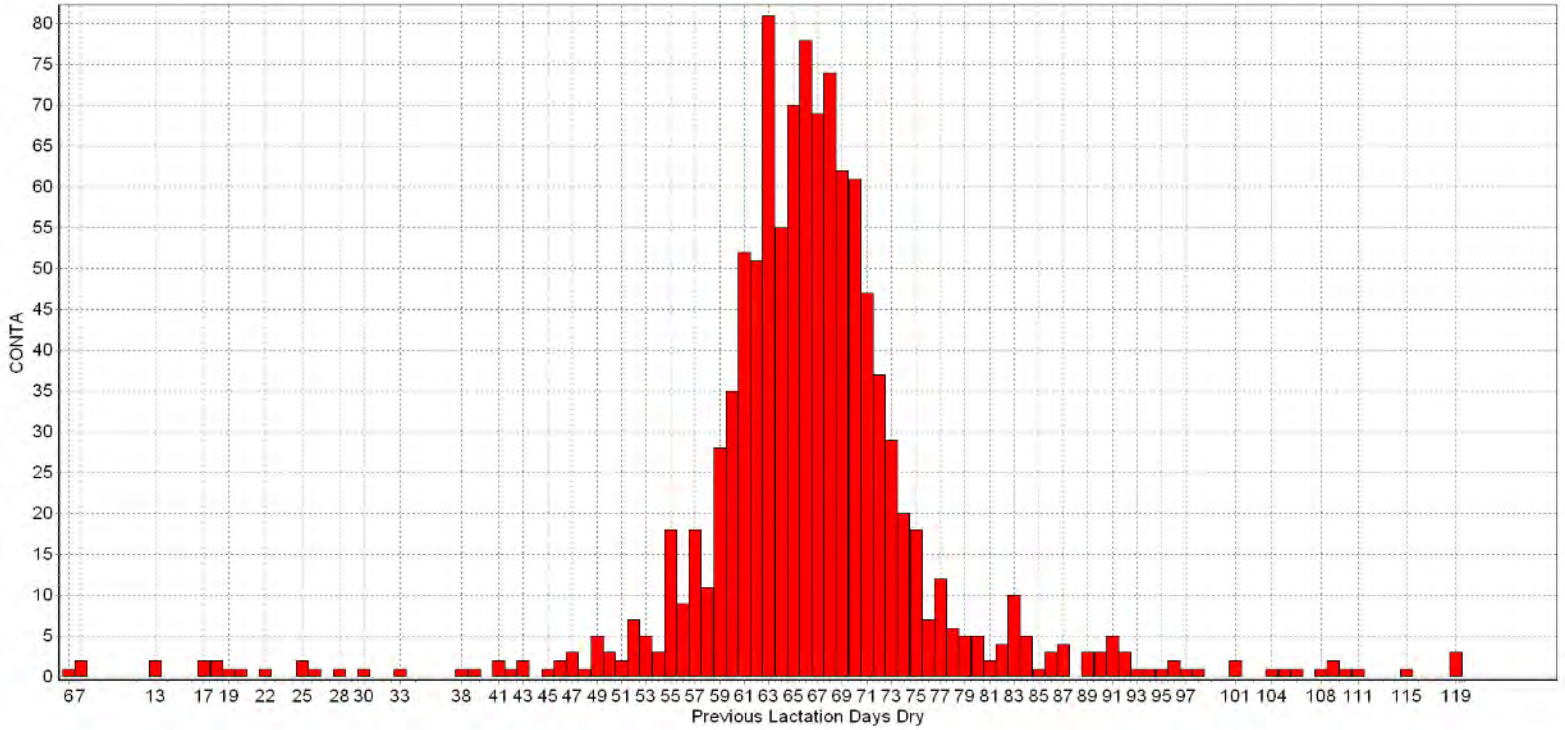
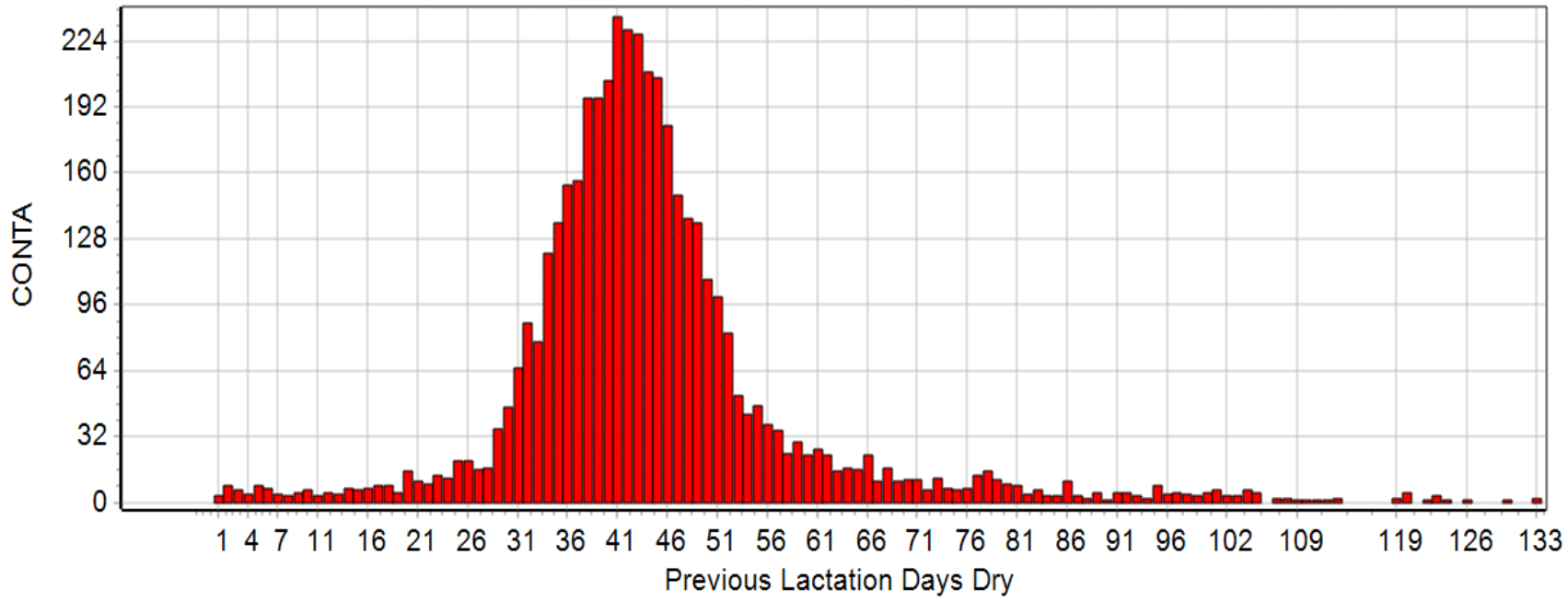


Per massimizzare la produzione di latte ed ottimizzare le performance riproduttive, il 90% degli animali deve avere un periodo di asciutta di 40 gg!



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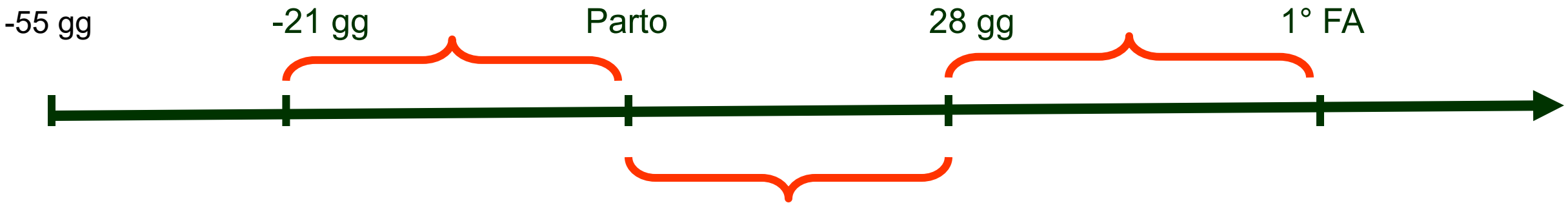
Periodo di transizione (Asciutta + Post Partum)

Close up:
255 gg di gestazione
Corretta movimentazione
Dieta (anionica?) che minimizza patologie pp

Alta produzione:
Dieta per massimizzare produzione di latte
e recupero peso corporeo
Scegliere appropriato protocollo per 1˚ FA



Dry-off:
220 gg di gestazione
Corretto peso corporeo (BCS)
Programma vaccinale e pareggio podale
Evitare sovraffollamento
Dieta bilanciata per ridurre eccesso energetico

Post-partum:
Monitorare patologie (RP, LDA & MF)
Dieta che promuove ingestione ss

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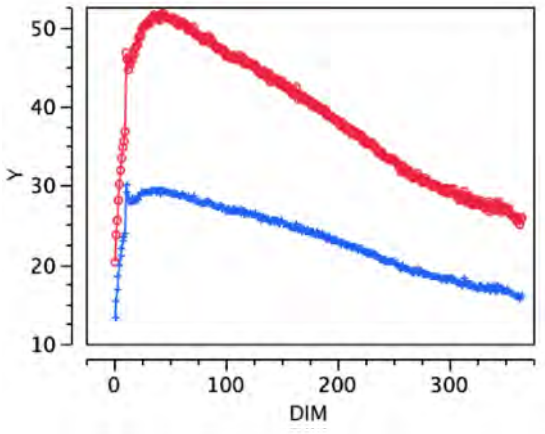
Come alimentare le vacche asciutte?

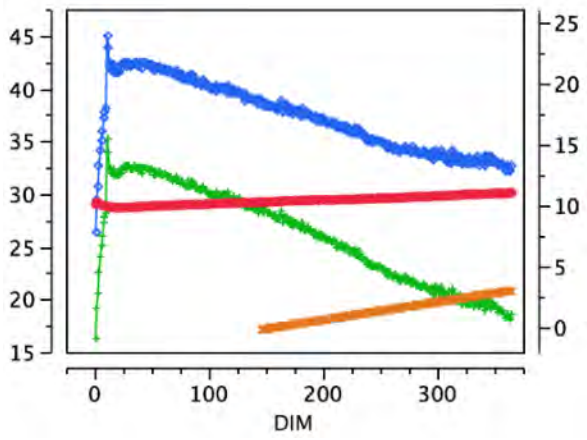
Calorie Necessarie nel Prepartum

Nelle ultime 3 settimane di gestazione una vacca gravida (BW = 680 kg) più 50 kg di utero/feto:

- ✓ Mantenimento 11 Mcal/g di NEl
- ✓ Altre 5 Mcal/g per la crescita dei tessuti fetali
- ✓ Per un totale di **16/17 Mcal/g** da somministrare in asciutta
- ✓ DMI (dry matter intake) = **12-13 kg a giorno**
- ✓ **Energia necessaria = 1.32 MCAL / kg di ss** (1.32 x 12.5 = 16.5 MCAL/g)

Milk yield, kg/d
Milk yield, Mcal of NEl/d





NE Maintenance
NE gestation
NE lactation
Total NE

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Razione Vacche Asciutte

- ✓ **Energia per giorno 16 Mcal (1.32 x 12.5 = 16.5 Mcal/giorno)**
- ✓ **Un gruppo ed una sola razione bassa in energia (15% max di amido)**
- ✓ **Proteine al 13.5% (vacche) o 14.5% (manze) = 1700 grammi CP al giorno**

Density (Mcal/kg)	Necessary DMI to supply 15 Mcal/d	Energy supplied by 12.5 kg of DM
1.32	11.4	16.5
1.4	10.7	17.5
1.5	10	18.8
1.6	9.4	20
1.65	9	20.6

The NRC (NASEM 2021) concludes that supplying a ration with 1.32 Mcal of NEl/kg reduces the risk of post-partum clinical and subclinical ketosis!

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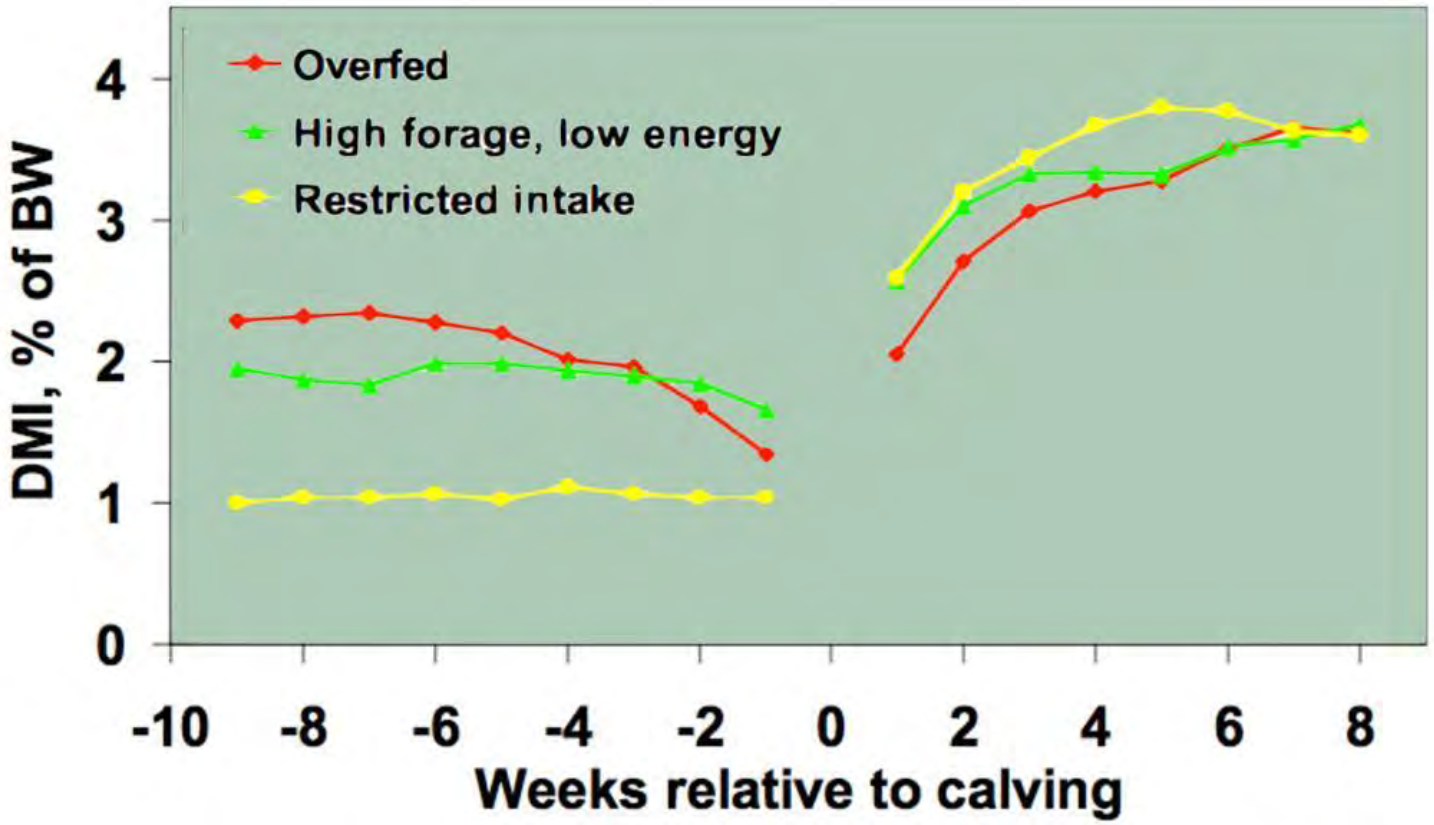
Razione Vacche Asciutte



Janovick-Guretzky and Drackley, 2006

Metabolismo Energetico

TMR
NEL 1.58 Mcal/kg

Cow 55 kg
30 kg DM
NEL
1.58 Mcal/kg
47.4 Mcal/d

Cow 28 kg
22 kg DM
NEL
1.69 Mcal/kg
37.5 Mcal/d
w/o correction
34.8 Mcal/d

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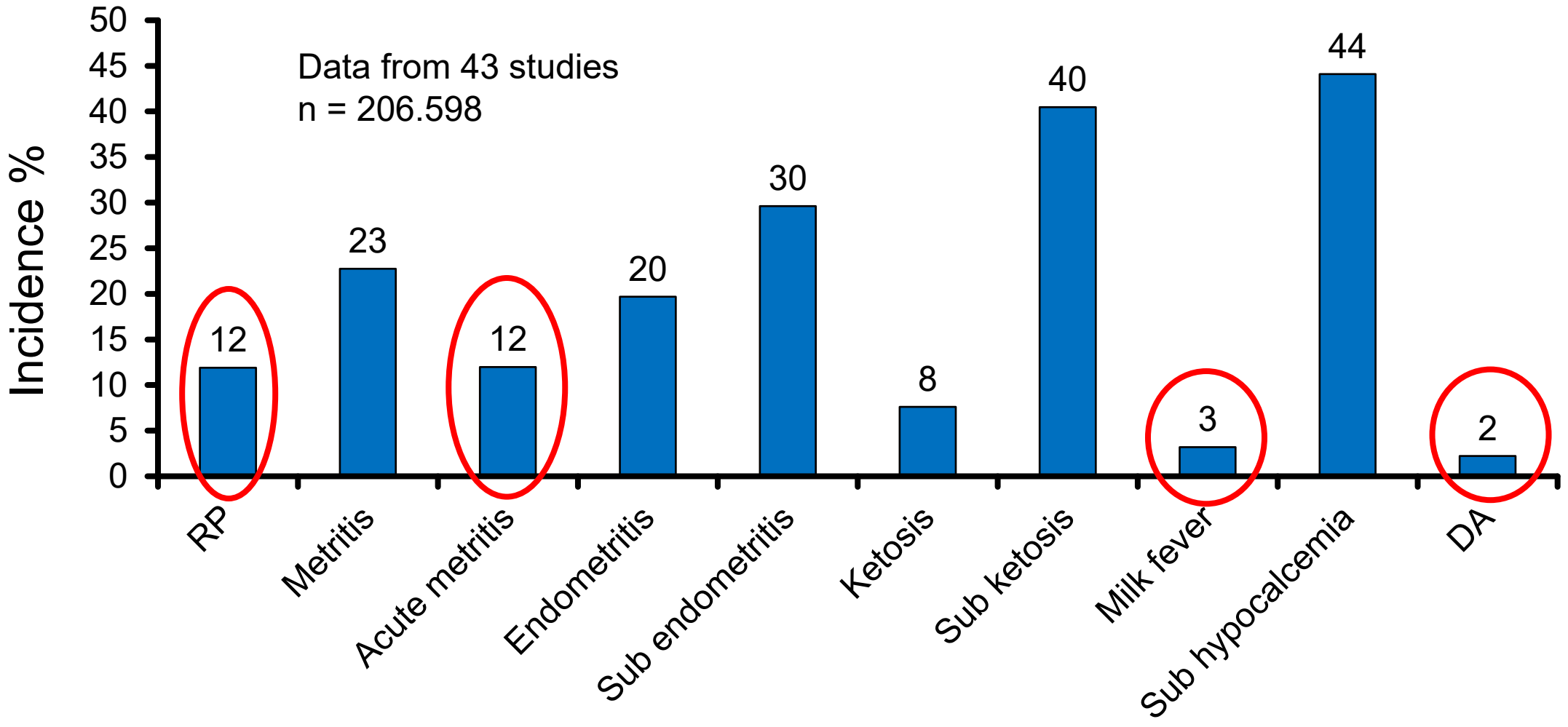
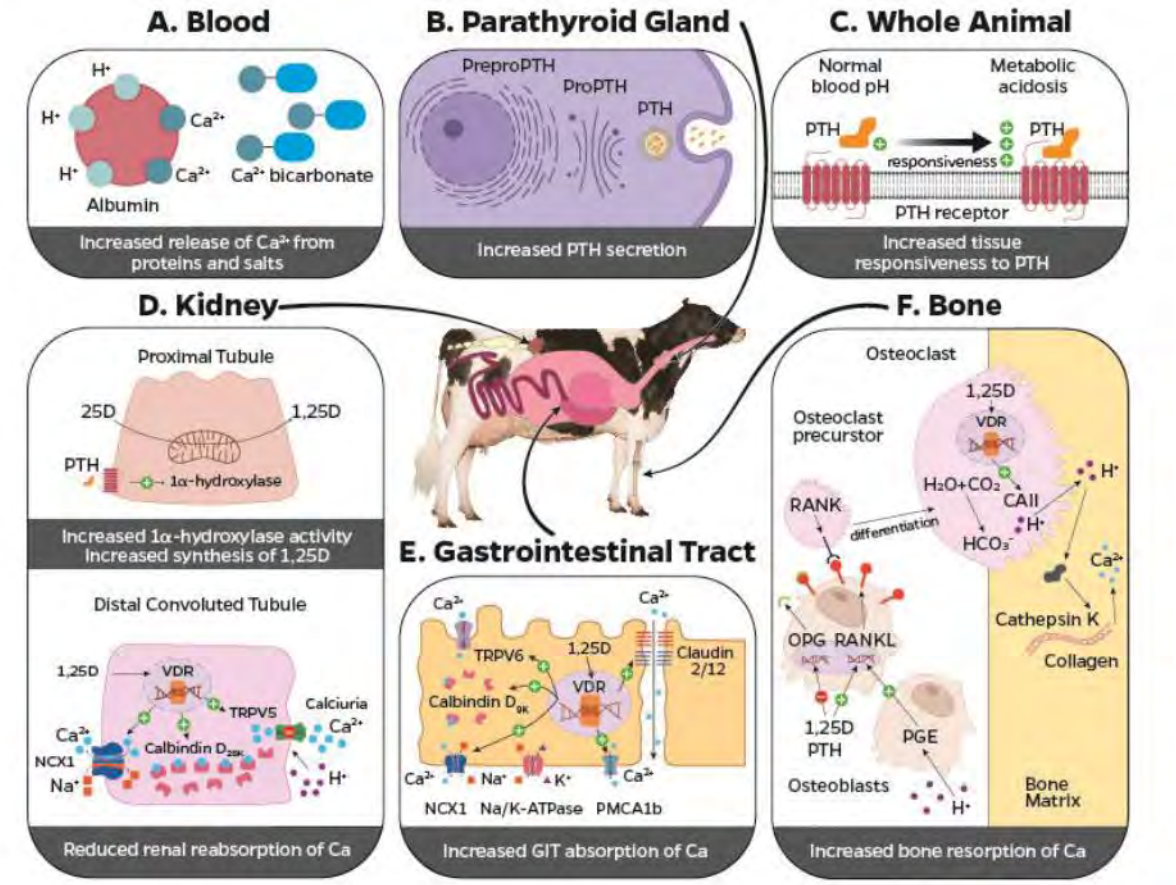
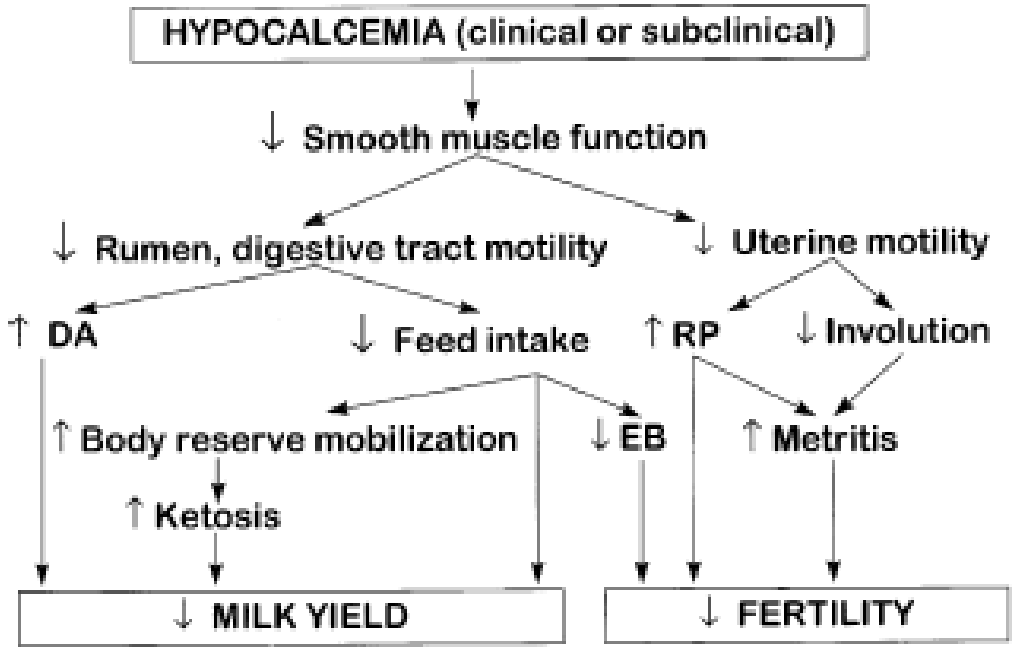
Incidenza patologie post-partum



Santos, V.G. 2015

Ipocalcemia (Ca^{2+}< 8.5 mg/d o 2 mmol/L)
Ogni lt di colostro contiene 1 gr di Ca





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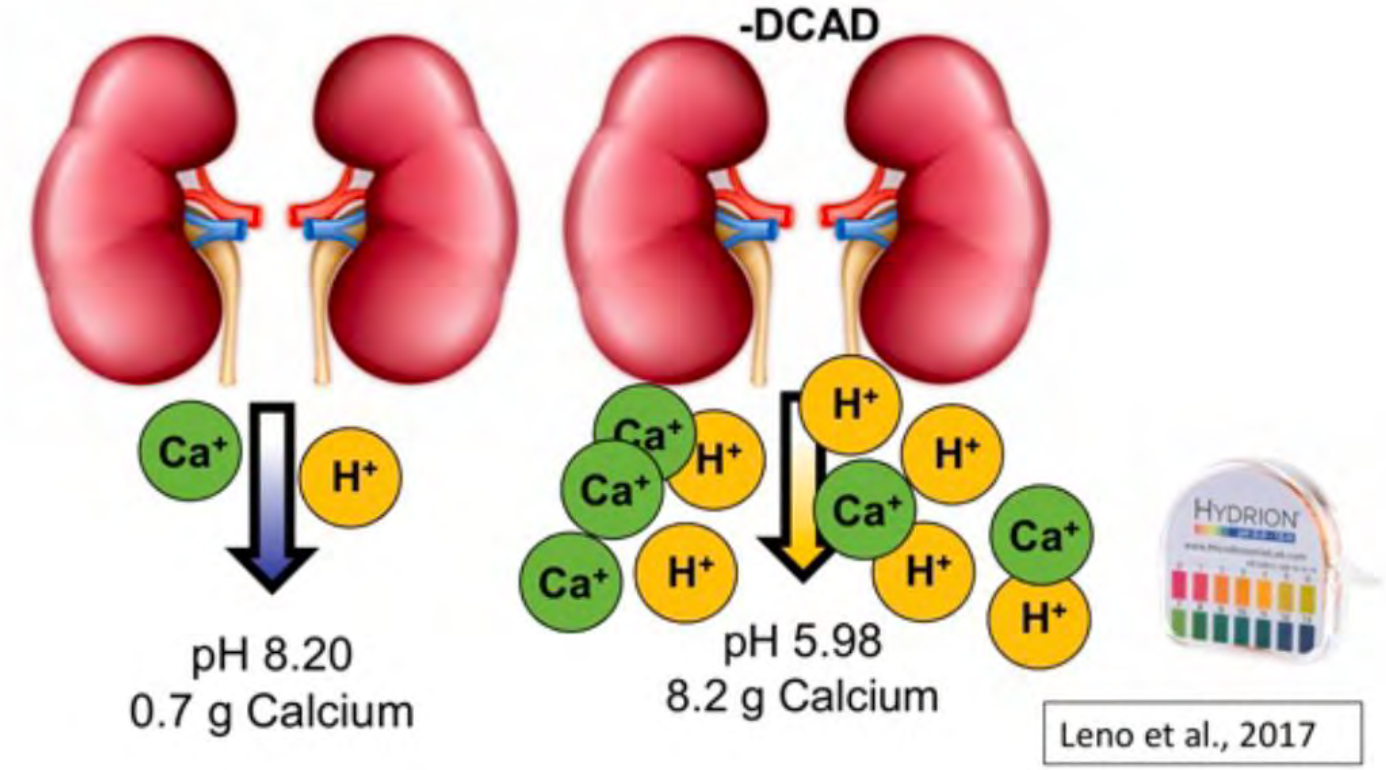
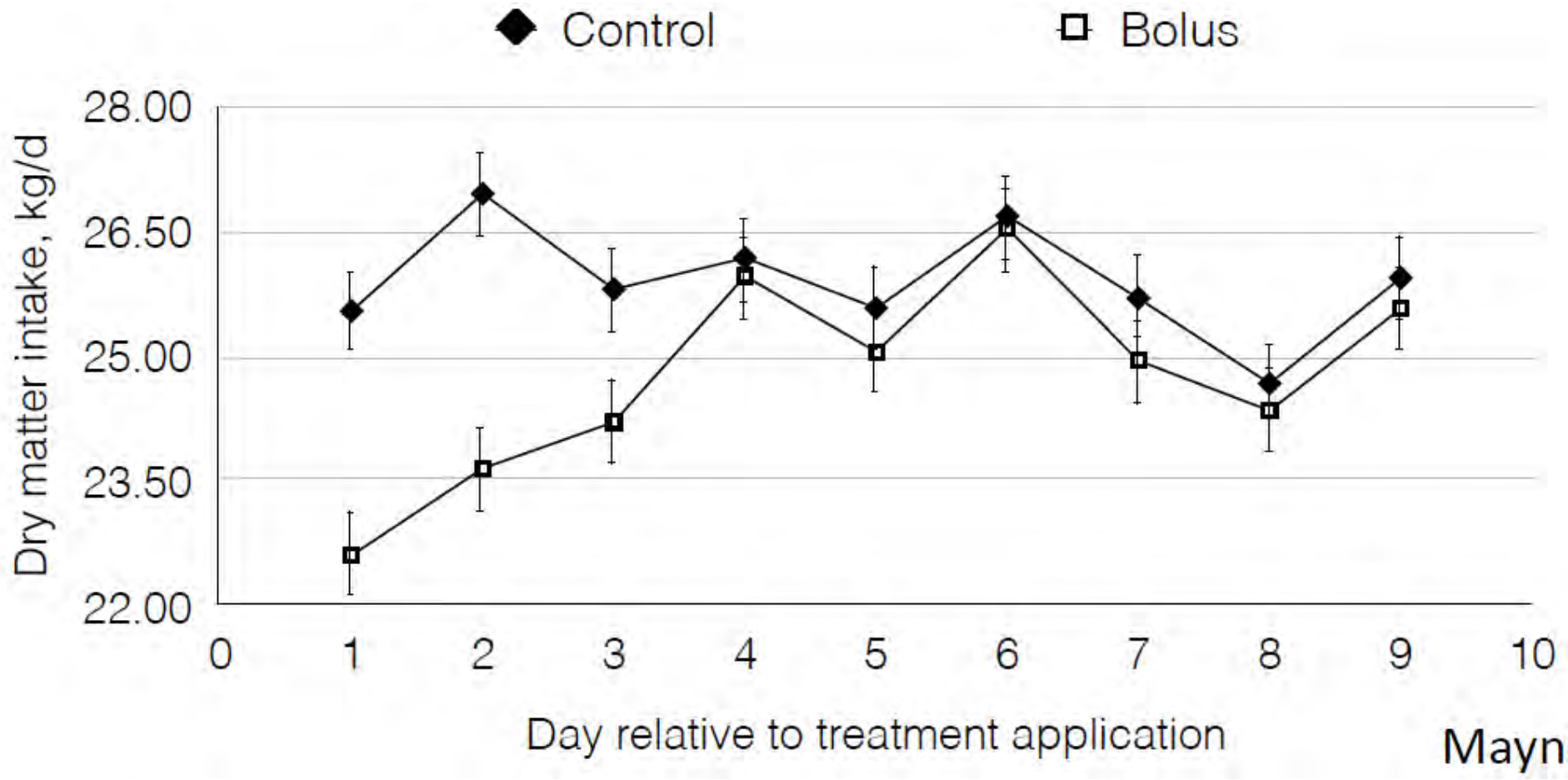
Prevenzione Ipocalcemia (DCAD)



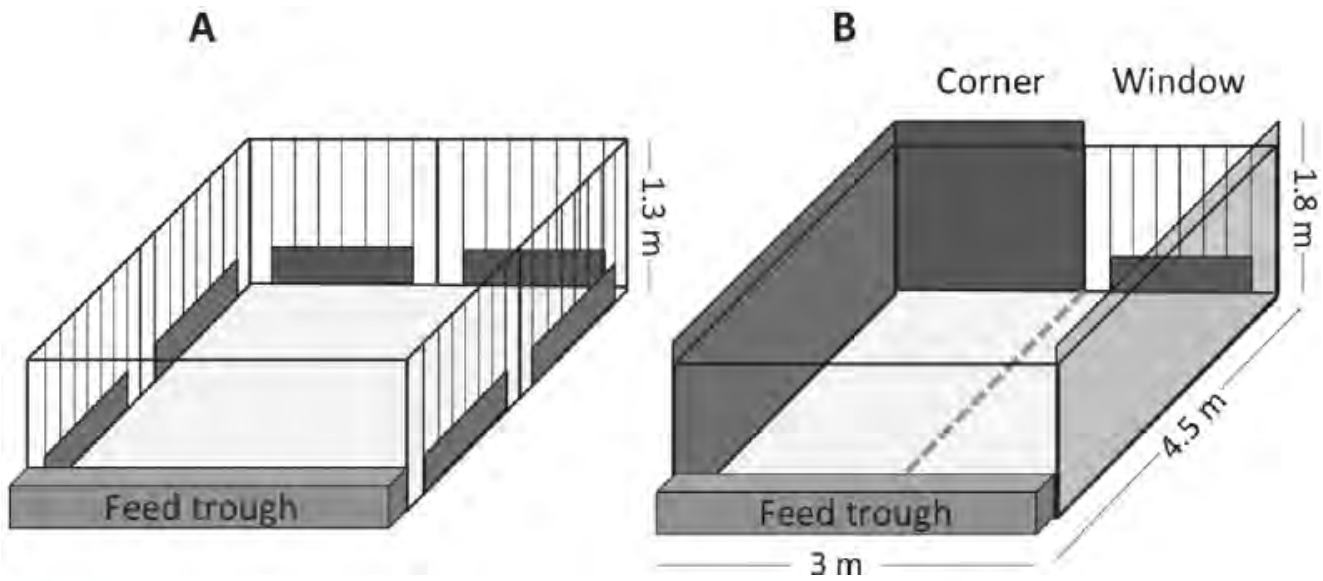
Sali anionici inducono una acidosis metabolica = <-5 mEq/100 g:
DCAD (mEq/100 g) = (Na/.023+ K/.390)-(Cl/.355+S/.016)

Prevenzione Ipocalcemia (DCAD)



Maynou et al. (2018)

Meta-analysis: Lean et al. (2006): Greater risk of milk fever with higher prepartum dietary DCAD (odds ratio = 1.015)



	Calving setting[1]				
Affliction	SINGLE % (cases/total)	GROUP % (cases/total)	Odds ratio[2]	95% CI[3]	*P*-value
Clinical hypocalcemia	0 (0/0)	0 (0/0)	-	-	-
Retained placenta	33.3 (5/15)	10.0 (2/20)	5.0	0.08-31.0	0.08
Metritis	33.3 (5/15)	5.0 (1/20)	10.6	1.07-104.1	0.04
Mastitis	13.3 (2/15)	15.0 (3/20)	0.43	0.04-4.69	0.49
Reached 250 DIM	73.3 (11/15)	95.0 (19/20)	38.0	5.89-37.1	<0.01

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Ahedo and Bach (2022)

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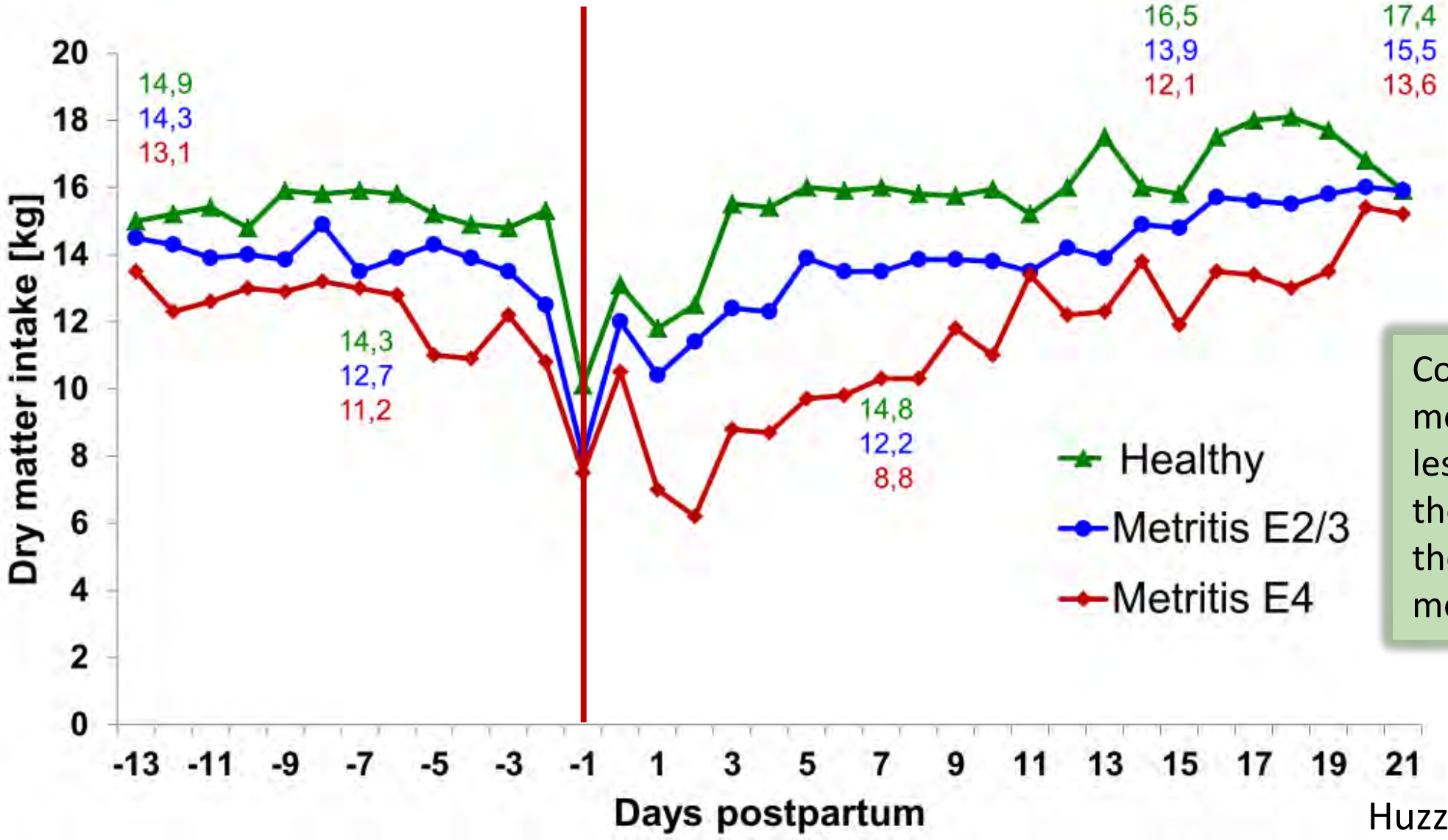
Ingestione Fattore di Rischio per Metrite



Cows with severe metritis ate 2–6 kg DM less than healthy cows in the 2–3 weeks preceding the clinical signs of metritis

Huzzey et al., 2007

Razione Vacche Asciutte

- ✓ **Le vacche asciutte hanno bisogno di 1.32 MCAL/kg ss di energia al giorno = 1.32 MCAL x 12.5 Kg DMI = 16.5 MCAL al giorno;**
- ✓ **Proteina al 13.5% (vacche) o 14.5% (manze) = 1700 grammi CP al giorno**
- ✓ Un gruppo ed una sola razione con almeno il 50% di foraggi;
- ✓ La razione deve avere il 50% di NDF (6 Kg di NDF al giorno);
- ✓ **Amido della razione max 15% e max 25% NFC;**
- ✓ Sempre presenti almeno 5 kg di paglia di alta qualità e ben tritata (3 cm);
- ✓ Le vacche devono mangiare minimo 13.5 kg di ss (12.5 kg le nullipare);
- ✓ Fosforo 40 gr (mai aggiungerlo perché e' sempre in eccesso);
- ✓ Calcio 1.2% (125 - 150 gr);
- ✓ Magnesio (Mg) > 0.40%;
- ✓ Potassio (K) più basso possibile (Mg/K = 1/4);
- ✓ Vitamin E (1,500 IU/d) & Selenium 0.3 ppm.

Monitorare costantemente ingestione sostanza secca!!!

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NASEM Nutrient Requirements for Dairy Cattle 2021

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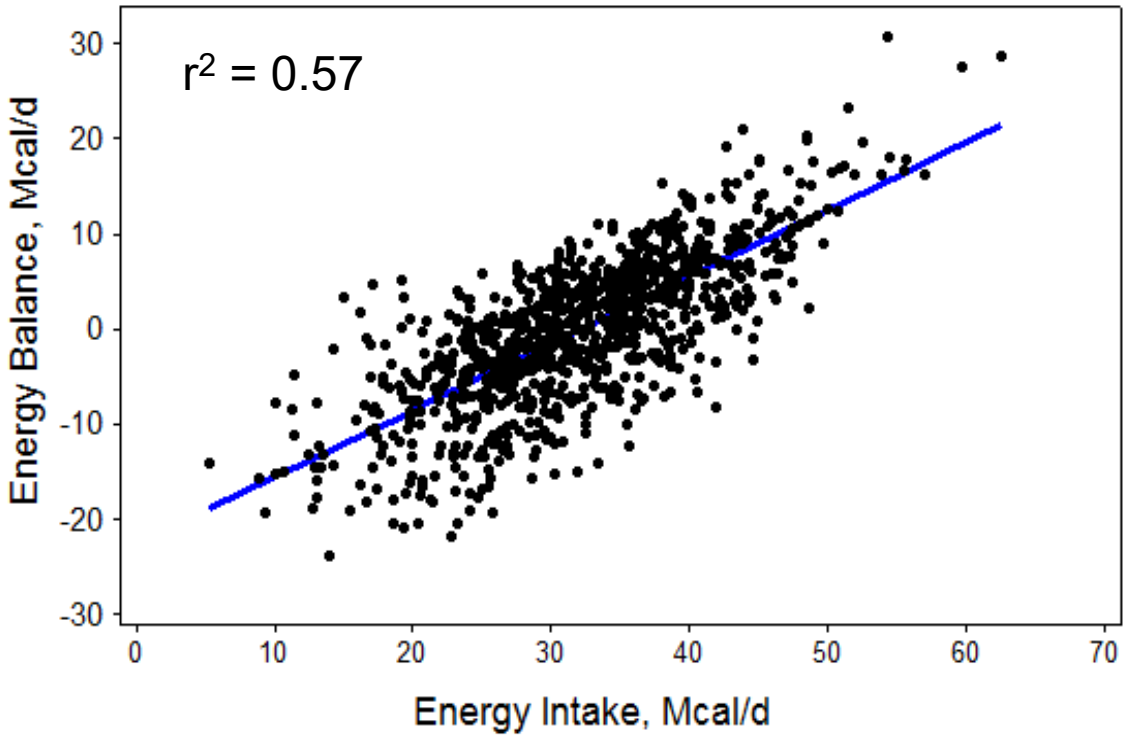
Razione Vacche Post-Partum (0-21 gg)

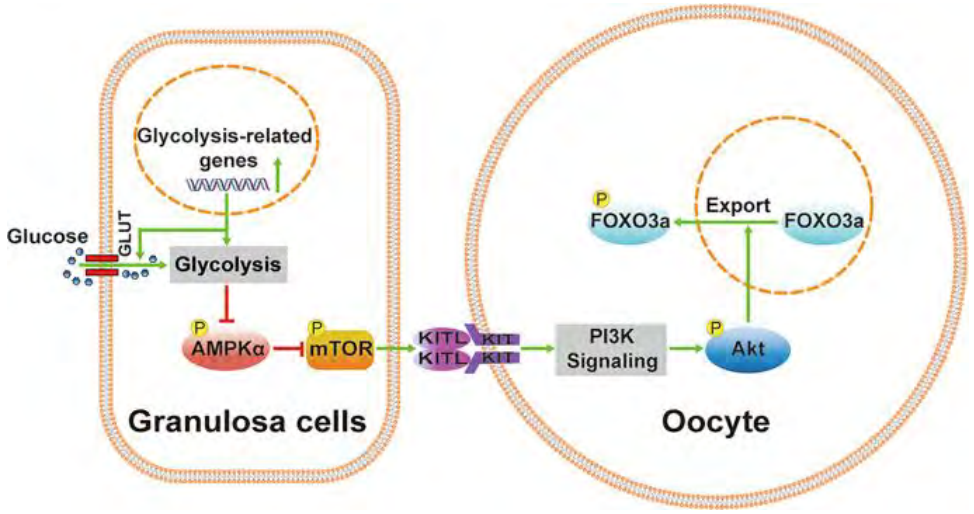
- ✓ Un gruppo post-partum per i primi 21-28 gg
- ✓ Energia per giorno 30 Mcal (1.65 x 18.5 = 30.5 Mcal/giorno)
- ✓ Proteine al 16%, NDF tra il 30 e 34% e AMIDO 28%
- ✓ Monitorare costantemente ingestione sostanza secca (14 – 22 kg)



Santos et al. (2010) Soc. Reprod. Fertil. Suppl. 67:387-403

Fecondazione (nutrire l'oocita)

1. **Gli oociti utilizzano principalmente il glucosio come fonte di energia;**
2. **<u>Il glucosio diventa cruciale durante lo sviluppo embrionale e il suo assorbimento aumenta rapidamente durante la fase di pre-implantation tardiva</u> (Hardy et al., 1989)**
3. Gli ovociti sono le cellule con il maggior numero di mitocondri ed il trasferimento di queste dalle cellule della granulosa agli oociti aumenta la qualità e lo sviluppo degli oociti stessi (Hua et al., 2007)



J. Dairy Sci. 102:5161–5171
https://doi.org/10.3168/jds.2018-15634

Diet starch concentration and starch fermentability affect energy intake and energy balance of cows in the early postpartum period

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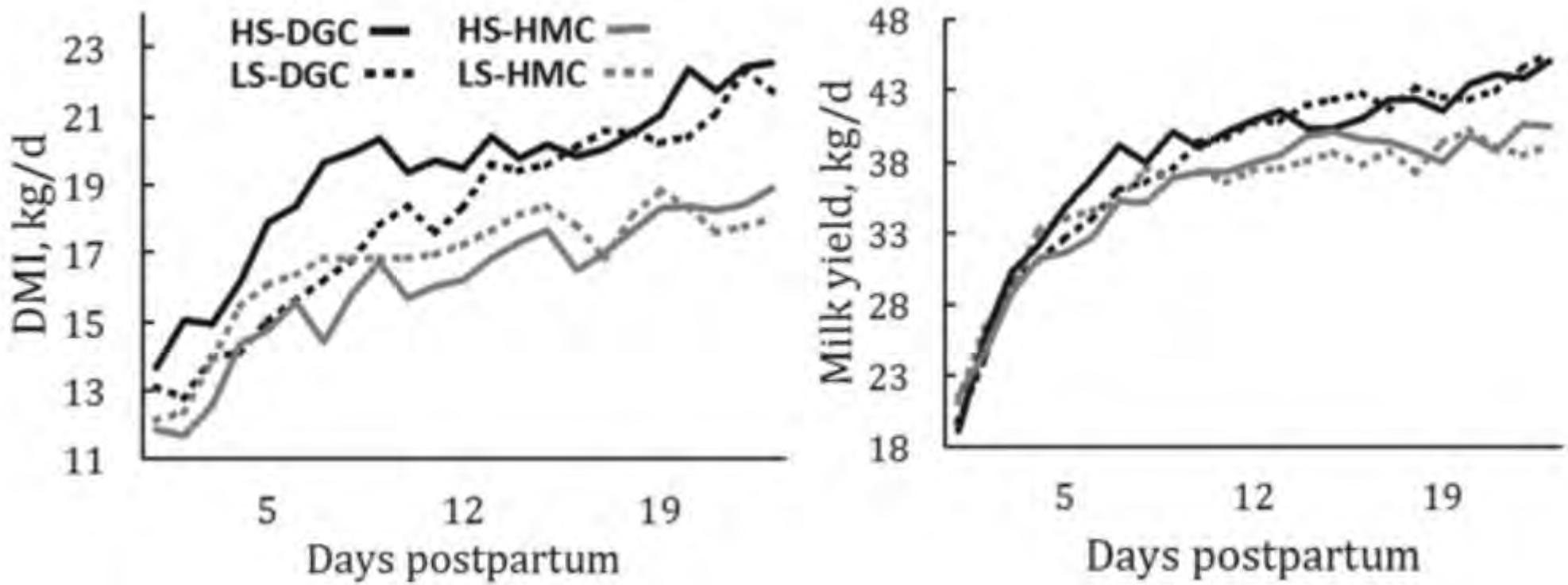
[1]Department of Animal Science, Michigan State University, East Lansing 48824
[2]Department of Animal Science, The Pennsylvania State University, University Park 16802



Underfeed Cow

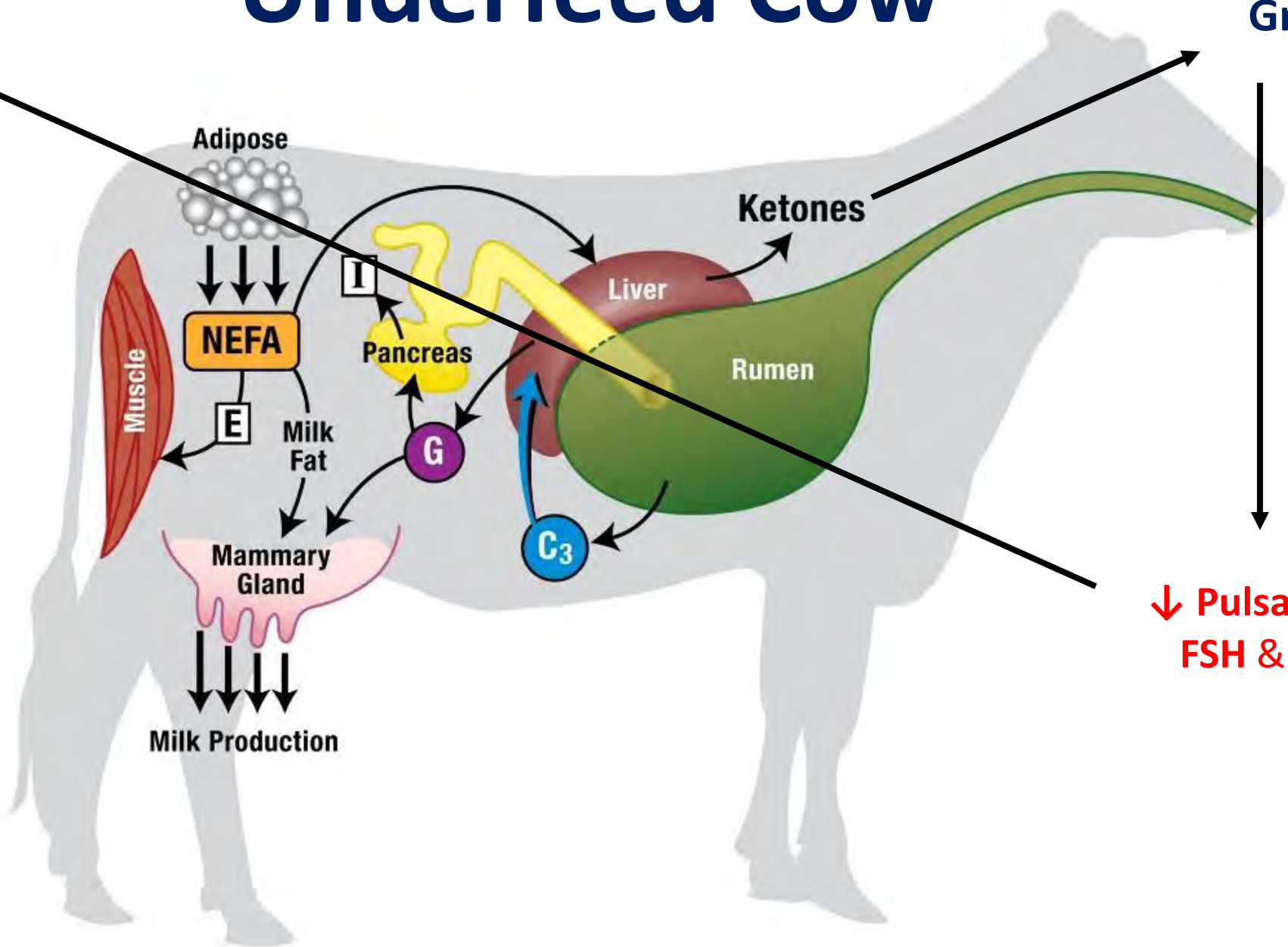
Ovaries

↓ E2 & P4

Anovular Condition

↓ Pulsatility GnRH

↓ Pulsatility FSH & LH



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Cosa monitorare?

Per valutare il passato

- ✓ Incidenza malattie pp
  - Milk Fever
  - RP & Metritis
  - Ketosis and DA
  - Mastitis
- ✓ Tasso di riforma 30 DIM
- ✓ Il picco del latte
- ✓ Costo dei trattamenti
- ✓ Malattie infettive

Per gestire la fertilità

- ✓ Lunghezza periodo asciutta
- ✓ Stocking density
- ✓ Cow Comfort
- ✓ Pen dynamics
- ✓ **Dry matter intake (DMI)**
- ✓ **Livelli energetici razione**
- ✓ **Livelli proteici della razione**
- ✓ Qualità ed accessibilità acqua

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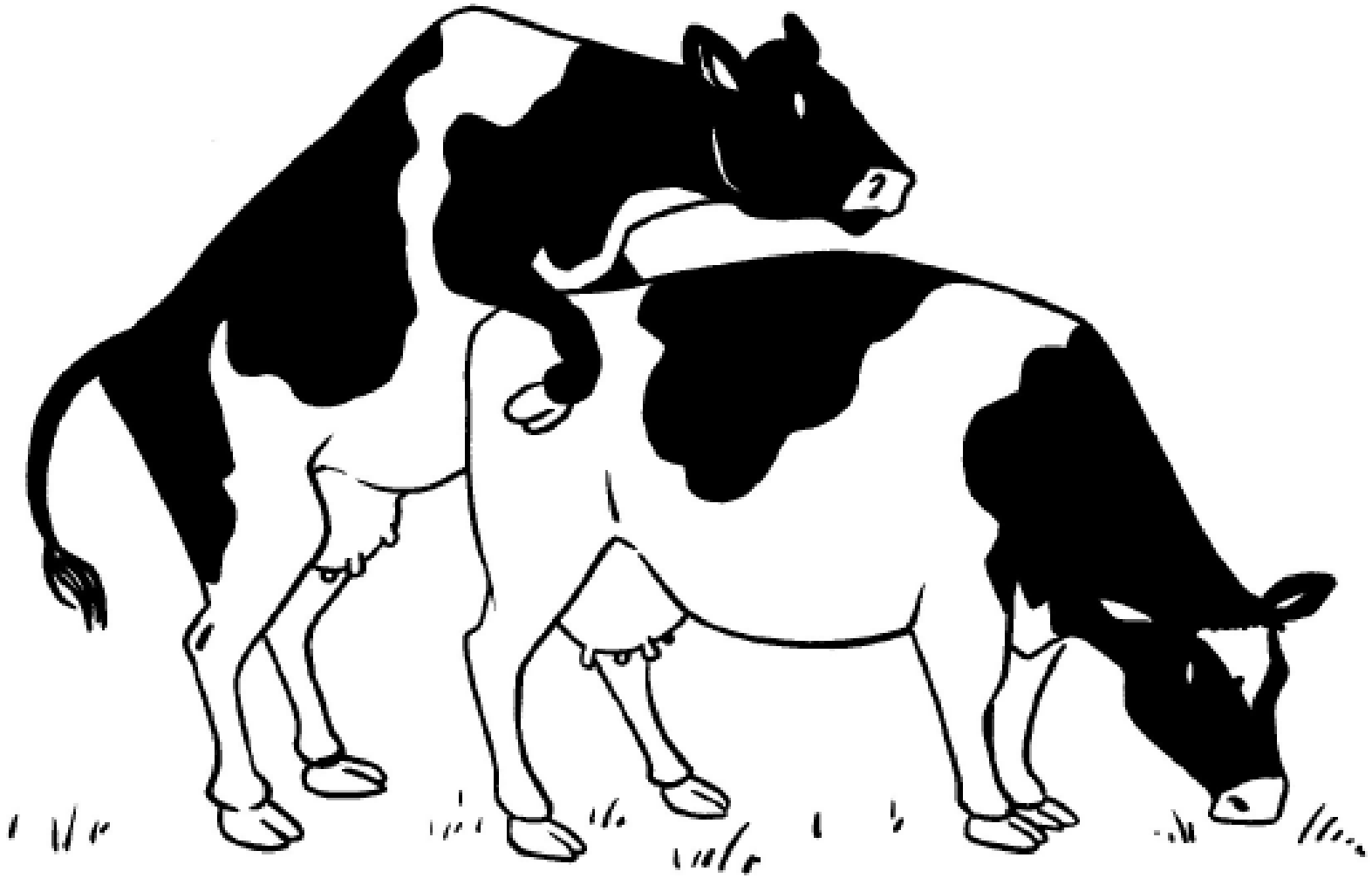
Efficienza Riproduttiva



Reproductive Goals

Prima inseminazione artificiale (FA)

1. Tutte le vacche fecondate entro i 90 gg
2. Tasso concepimento/FA > 55%

Seconda e successive inseminazioni artificiali (FA)

1. Intervallo ridotto tra le FA

   Nessuna vacca con intervallo > 42 gg tra FA
2. Tasso concepimento/FA > 40%

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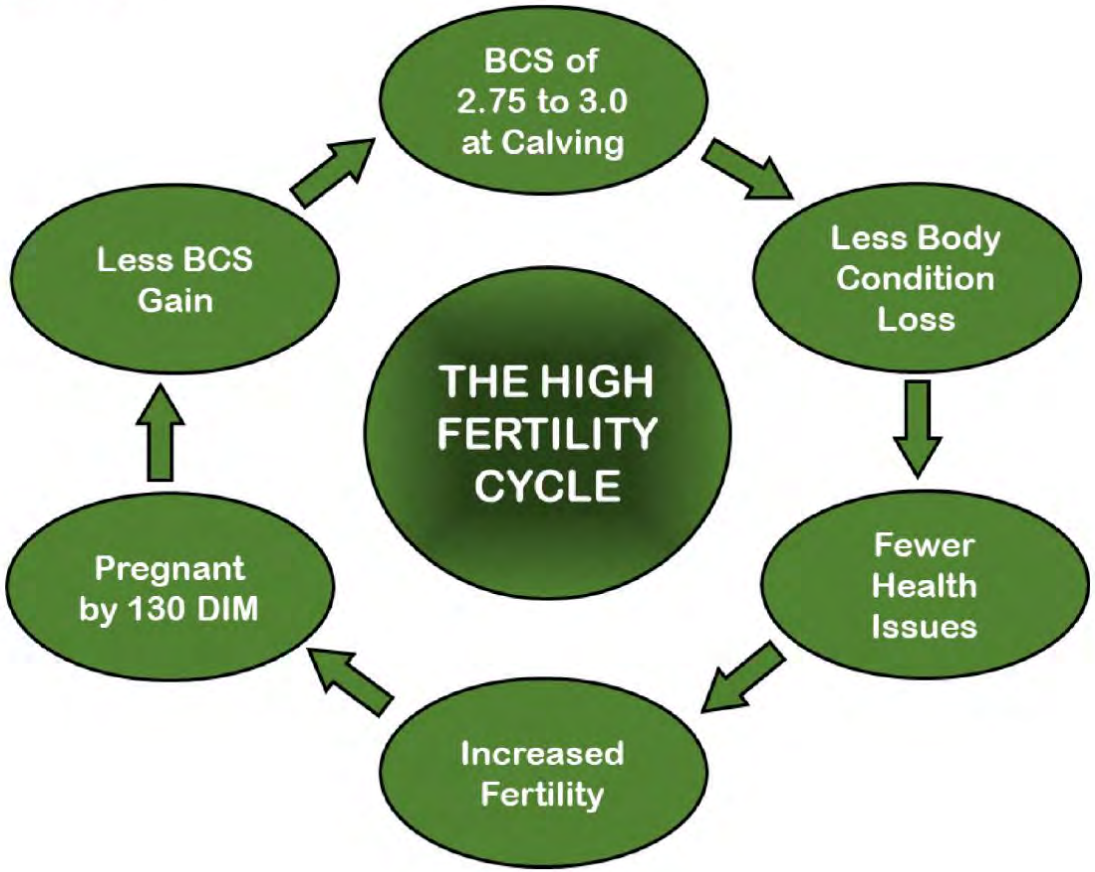
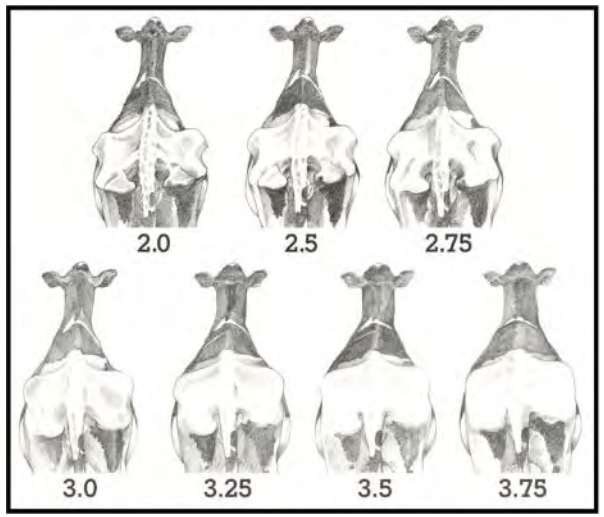
JDS Communications®
2022; 3

https://doi.org/10.3168/jdsc.2022-0280
Mini-Review
Physiology

Mini-Review: The high fertility cycle

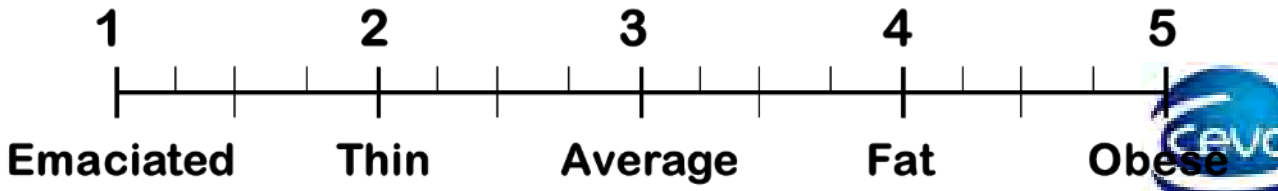
P. M. Fricke,[1]* M. C. Wiltbank,[1] and J. R. Pursley[2]





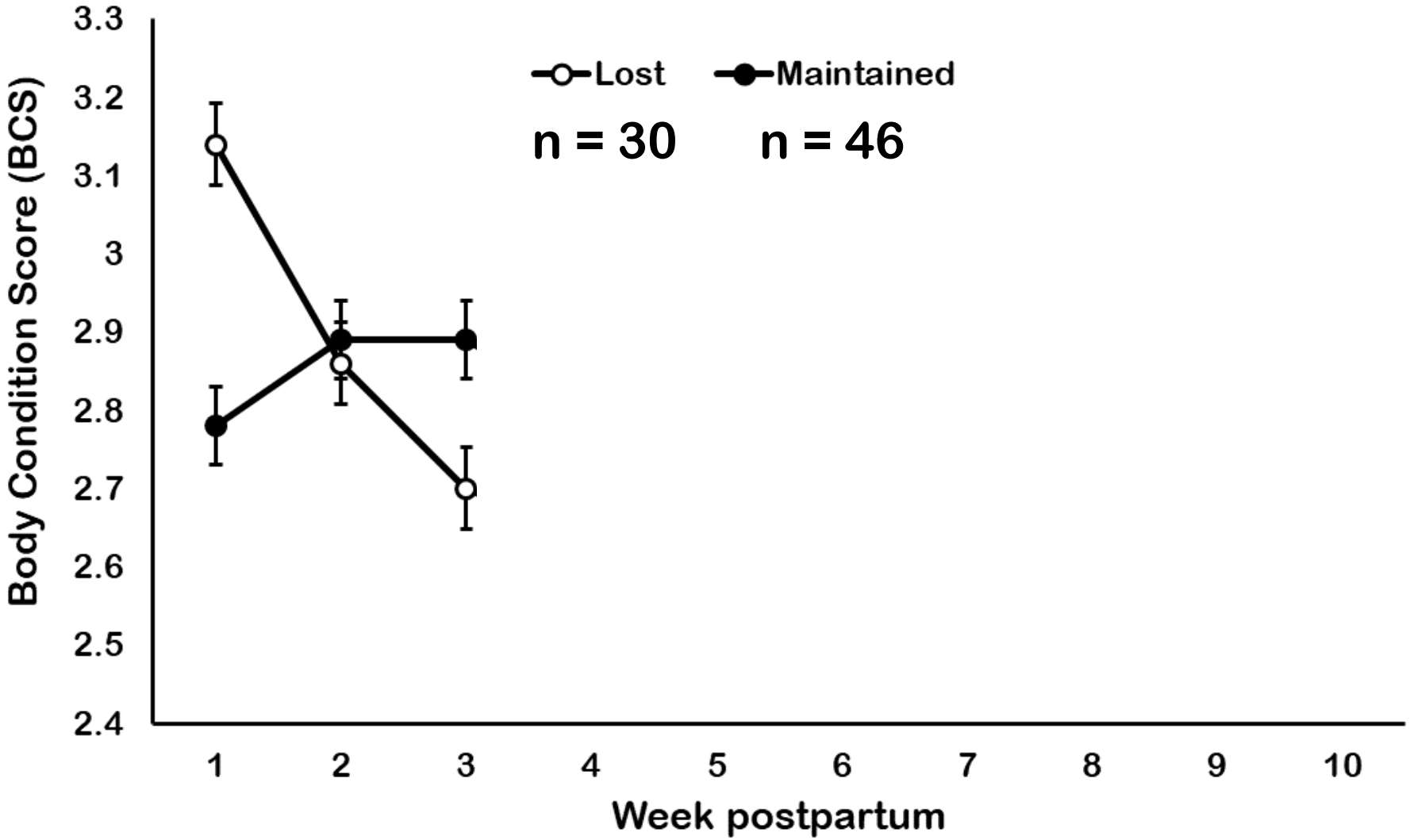
Body Condition Scoring

- BCS is a noninvasive method for estimating fat stores in live cows.
- Define: Ratio between amount of fat to the amount of nonfat matter (water, protein, ash) in the body of a living animal.
- Body condition change is an easy way to assess energy balance on farms.



Jack H. Britt

AABP 24th Annual Convention, 1992



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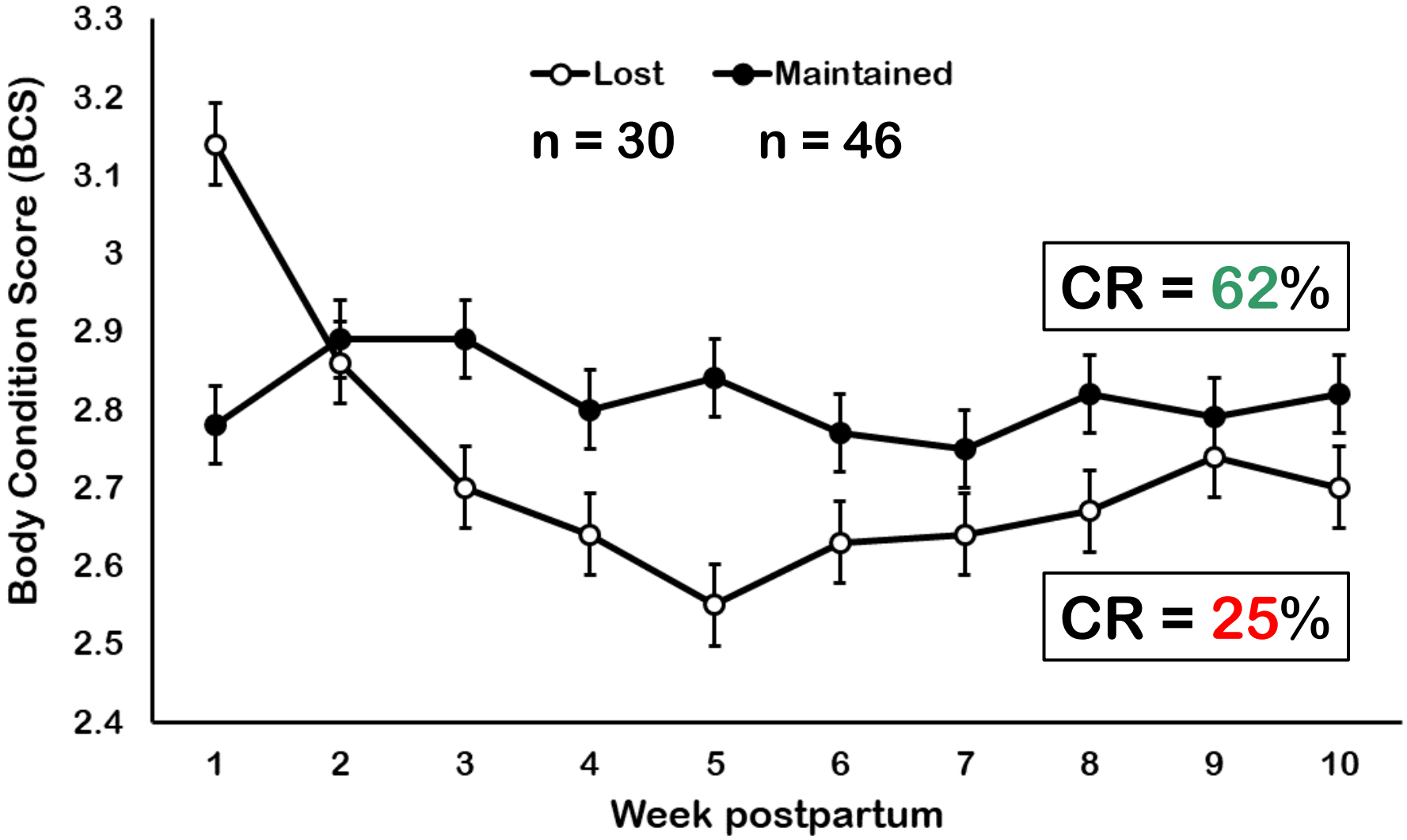

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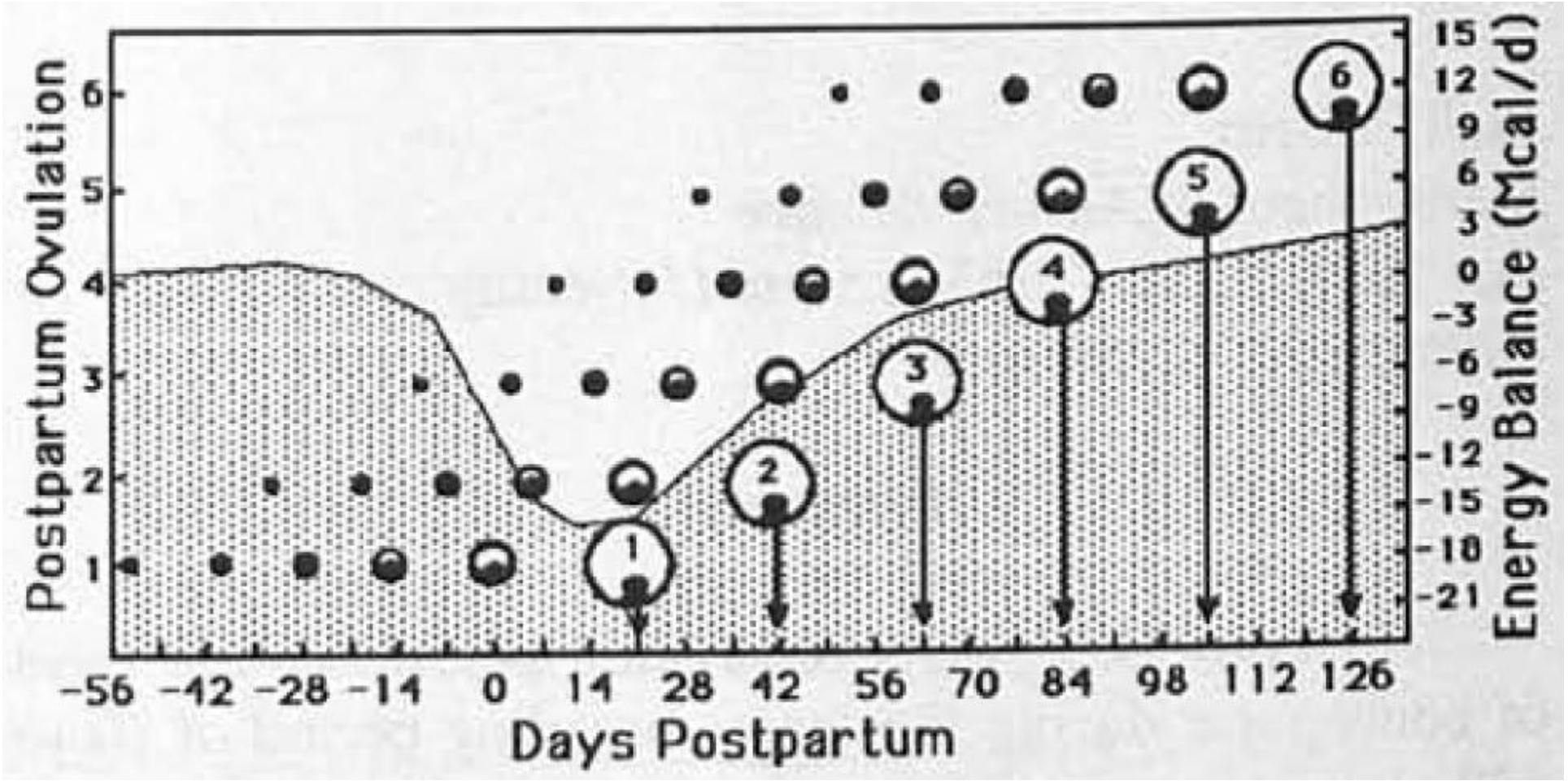

"The Britt Hypothesis"

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J. Dairy Sci. 97:3666–3683
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Relationships between fertility and postpartum changes in body condition and body weight in lactating dairy cows

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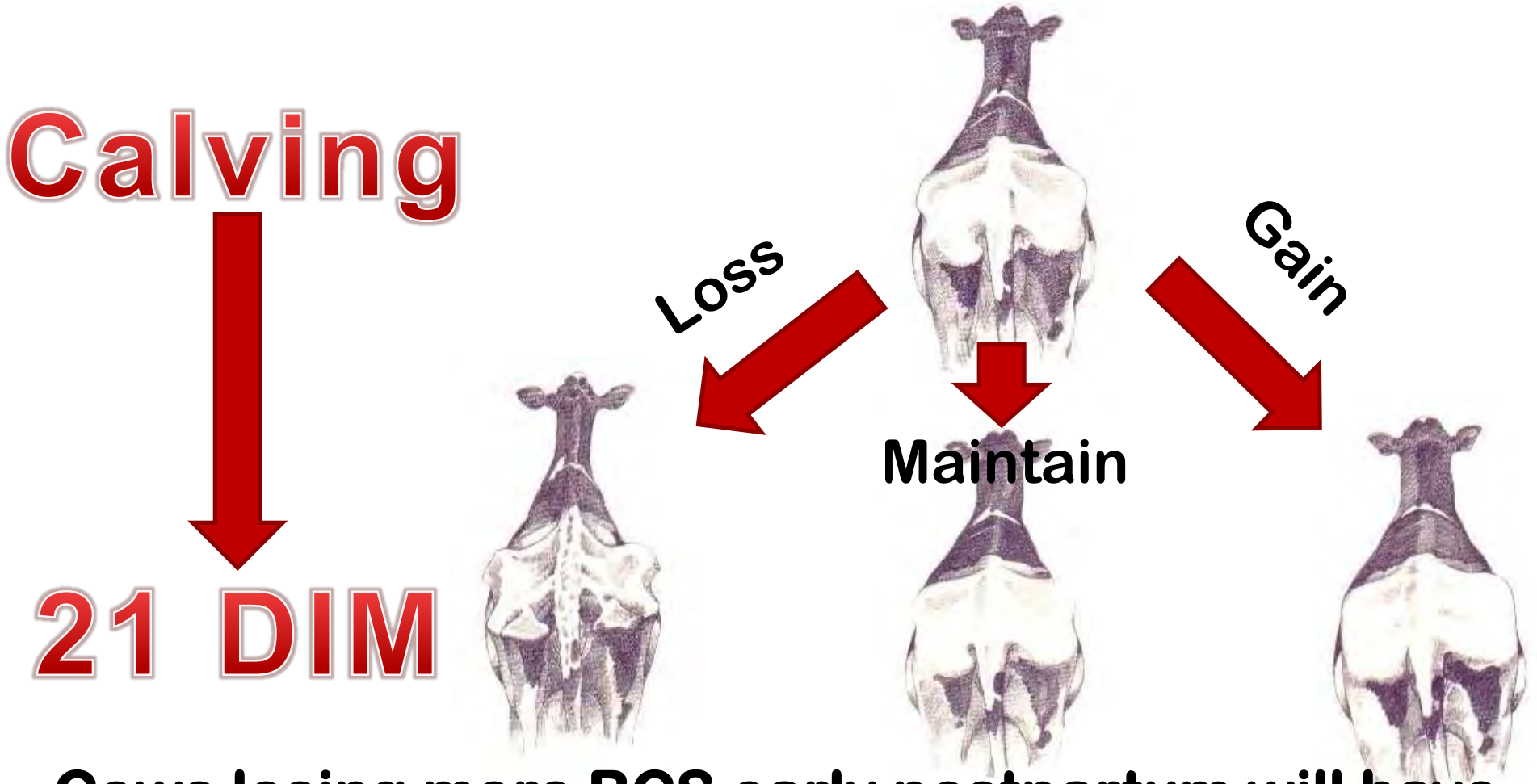
Does a change in BCS early postpartum affect fertility when using a Double Ovsynch protocol before TAI?



Cows losing more BCS early postpartum will have decreased fertility at first TAI

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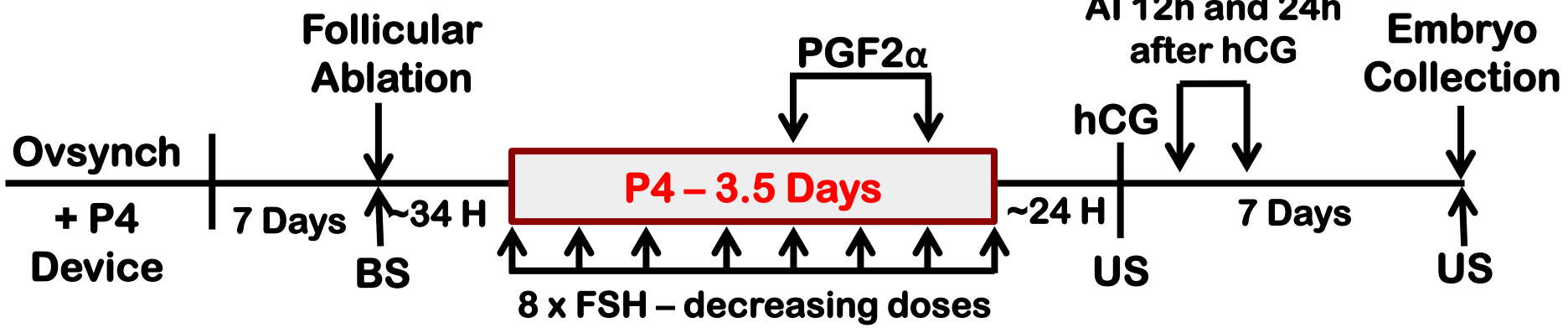
71 lactating dairy cows - synchronized and superstimulated with modified DO for 1st service



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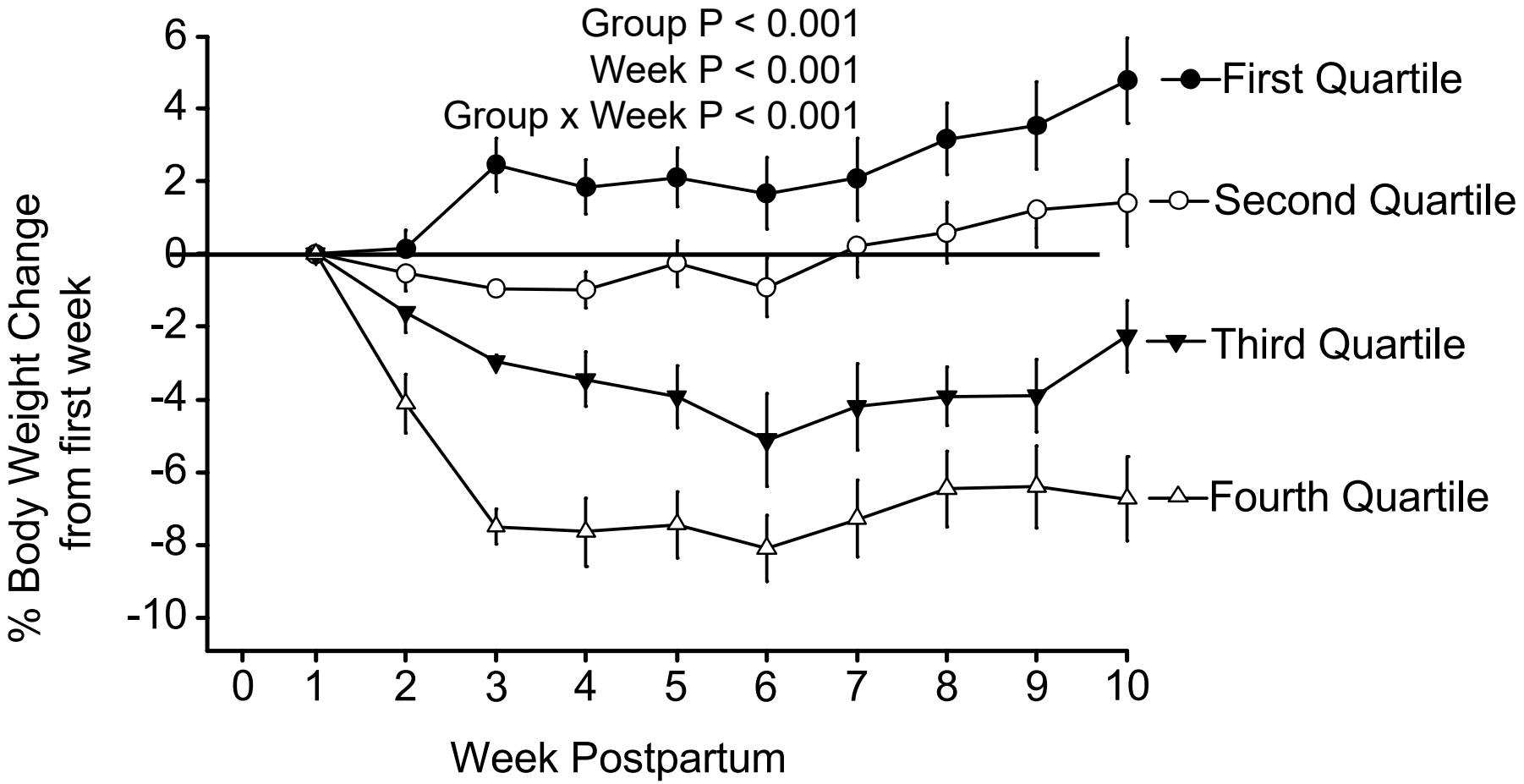
% BW change


Group P < 0.001
Week P < 0.001
Group x Week P < 0.001
First Quartile
Second Quartile
Third Quartile
Fourth Quartile
% Body Weight Change from first week
Week Postpartum
6
4
2
0
-2
-4
-6
-8
-10
0
1
2
3
4
5
6
7
8
9
10

Embryo Characteristics

	Quartile				P-value
	Fourth Q Lost +	Third Q Lost	Second Q Maintain	First Q Gain	
CL (#)	18.4±2.6	18.4±1.7	19.0±1.7	16.0±2.0	0.67
Fertilized (%)	76.9±7.1	77.0±6.6	77.6±7.6	78.4±7.1	0.99
Quality 1 & 2 (%)	38.0±8.7	61.3±8.2	60.6±9.4	63.4±8.6	0.14
Degenerate (%)	35.2 ± 8.5^{a}	12.6 ± 4.6^{b}	14.5 ± 6.3^{b}	9.6 ± 3.7^{b}	0.02
Qual 1 & 2 of Fert (%)	48.4 ± 9.5^{b}	78.3 ± 6.6^{a}	72.6 ± 9.5^{a}	77.7 ± 7.4^{a}	0.05
Degenerate of Fert (%)	$46.9\pm9.6^{a,A}$	$17.4\pm6.4^{b,B}$	$24.8\pm9.3^{ab,A}$	$16.2\pm7.0^{b,B}$	0.04

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Material & Methods

1,887 lactating dairy cows from 2 farms in WI
Synchronized with DO for 1st service

BCS evaluated at calving and 21 d later using a 5 points scale with 0.25 increments (Edmonson et al., 1989)

- BCS change = BCS21DIM - BCS at calving
- divided in 3 groups:
  - Lost BCS
  - Maintained BCS
  - Gained BCS

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% of cows, BCS at calving and 21 DIM all cows

	BCS Change			P-Value
	Lost	Maintained	Gained	BCS
% cows	41.8 (789/1887)	35.8 (675/1887)	22.4 (423/1887)	-
% Primiparous	47.3 (373/789)	52.7 (356/675)	55.1 (233/423)	0.02
BCS at calving	2.93±0.01^{a}	2.89±0.02^{ab}	2.85±0.02^{b}	0.005
BCS at 21 DIM	2.64±0.01^{c}	2.89±0.02^{b}	3.10±0.02^{a}	<0.001
Δ BCS	-0.29±0.00	0.00±0.00	0.25±0.00	-
Milk (kg/d)[1]	29.0±0.2	28.5±0.2	28.8±0.3	0.23

[1]From calving to 21DIM

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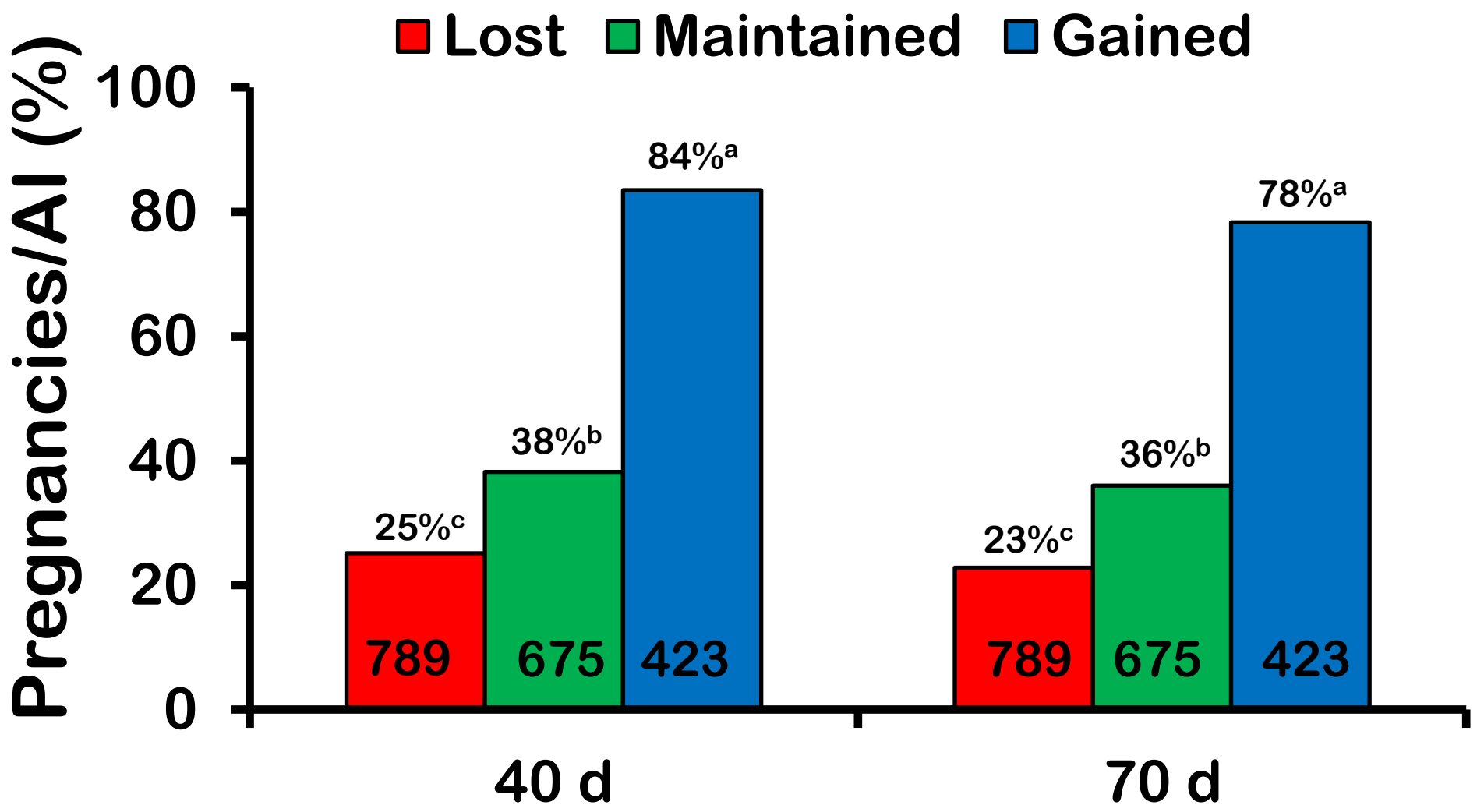
Pregnancies/AI



Impostare la 1° FA

SCR by Allflex
Make every cow count

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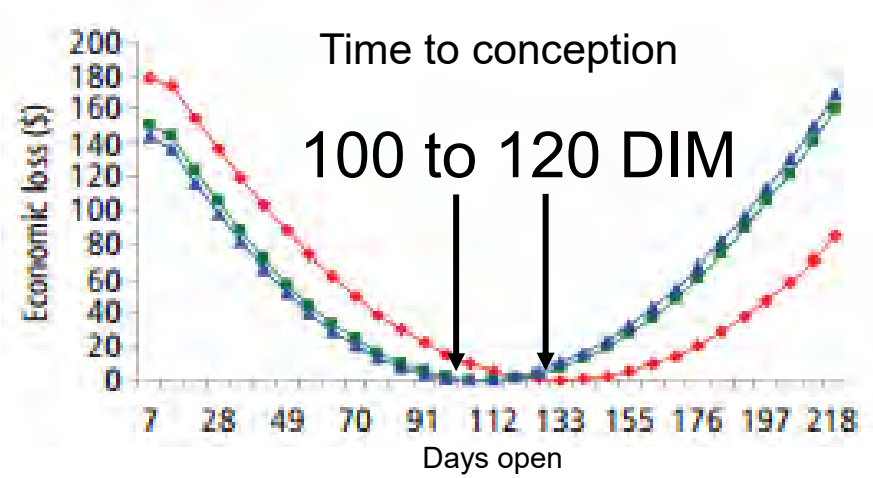
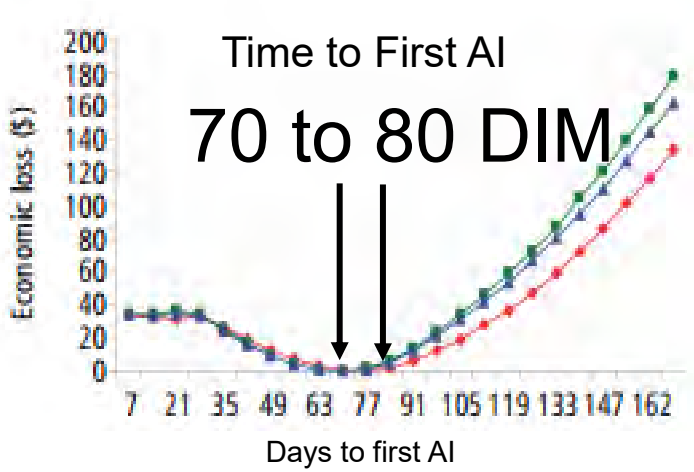
Ruolo fondamentale della 1° FA





Profit per cow per year increases with:

- increased milk yield
- decreased replacement cost
- conception rate
- service rate

→ Preg. rate

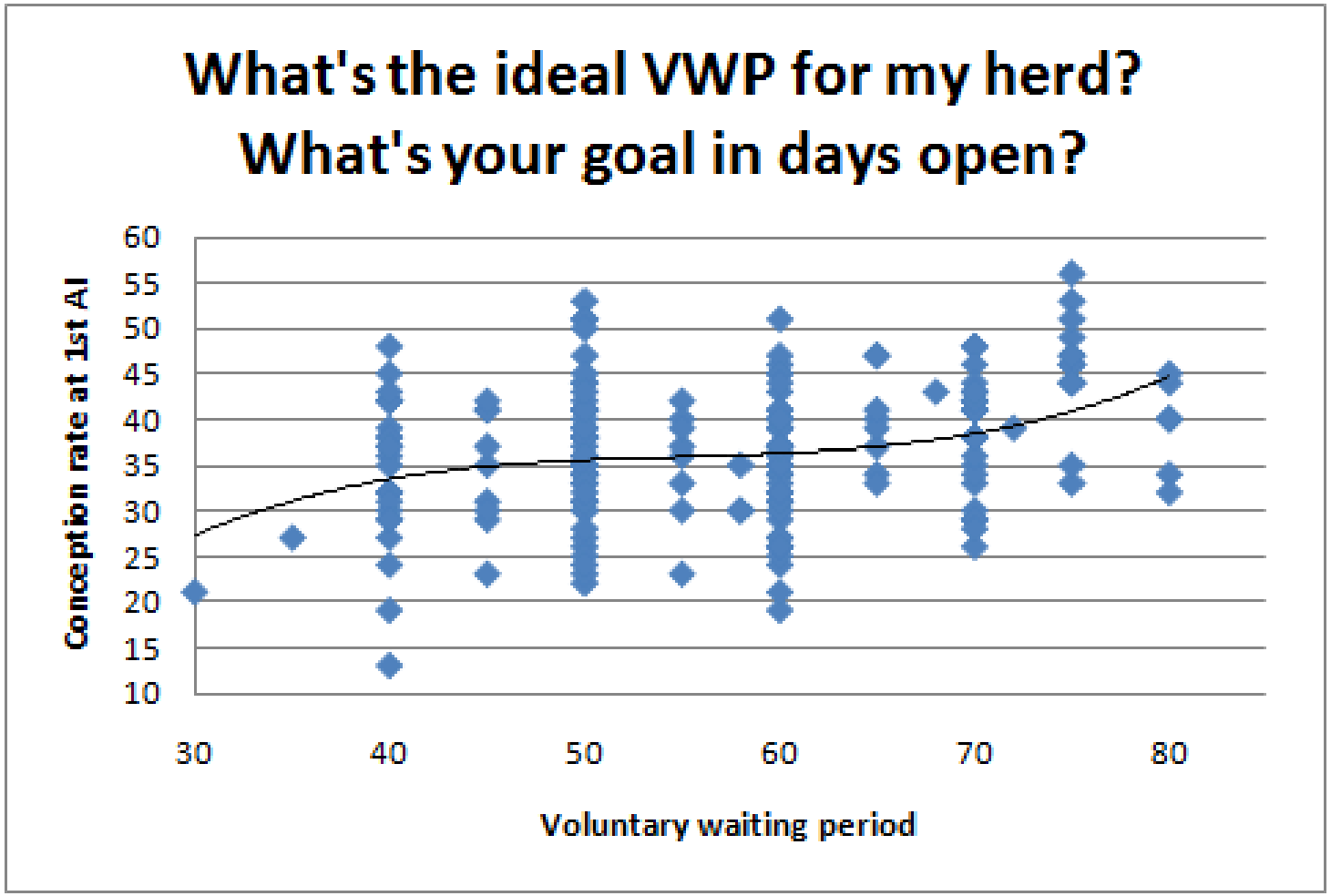
- decreased culling

Cost per pregnancy is affected by:

- DIM at breeding
- conception rate
- cost of labor
- drugs and semen
- time to next insemination
- feed cost

Calving Interval (13 months = 390 d)		
VWP (60 d)	21-d PR (0 to ? d)	Gestation (282 d)
Fixed	Variable	Fixed

VWP e Tasso di Concepimento 1° FA



Every 10 days delay VWP = need to capture 8% CR

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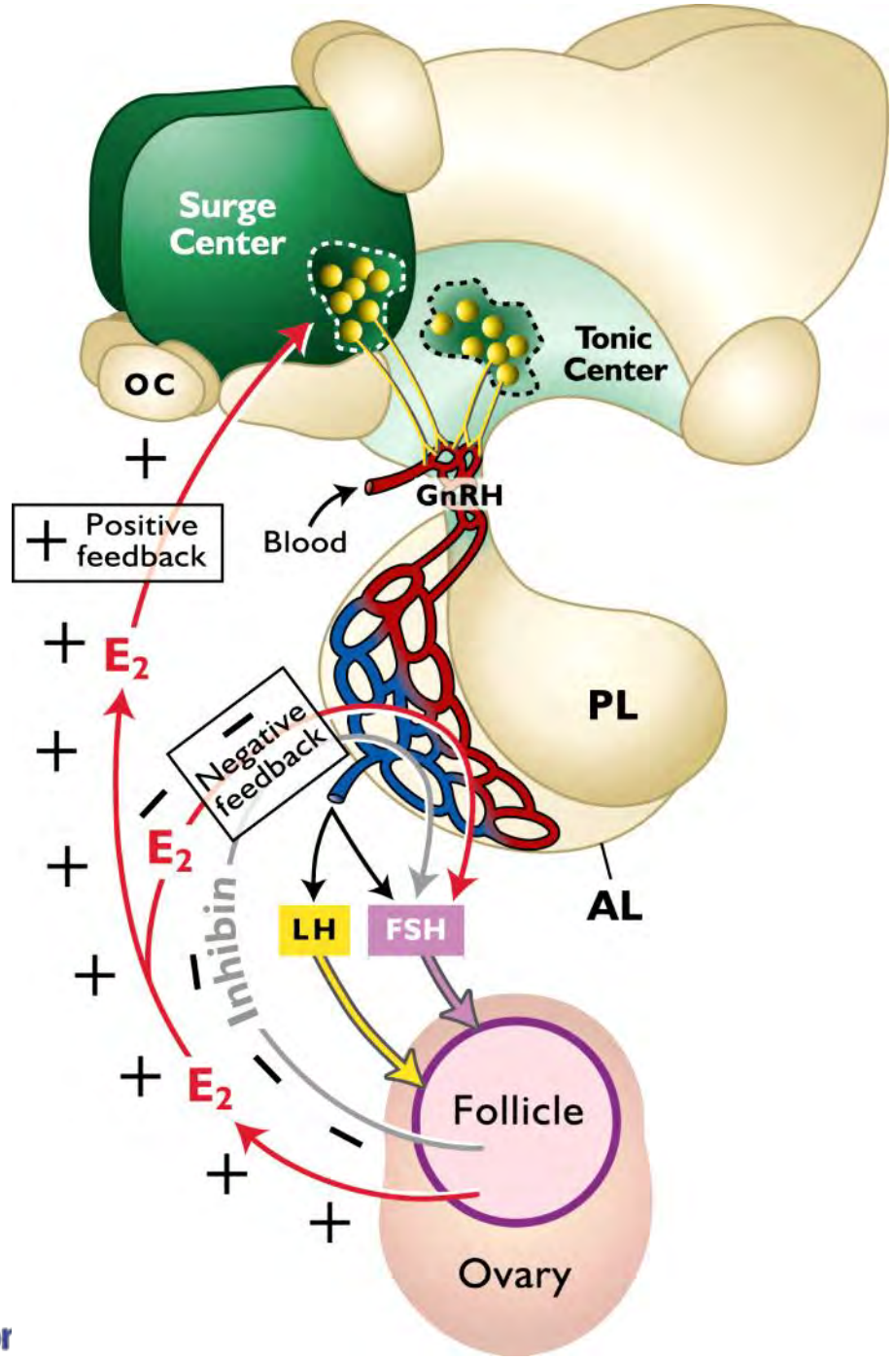


Hypothalamic – Pituitary Gonadal Axis

Hypothalamus

GnRH

Anterior Pituitary

Gonadotropins

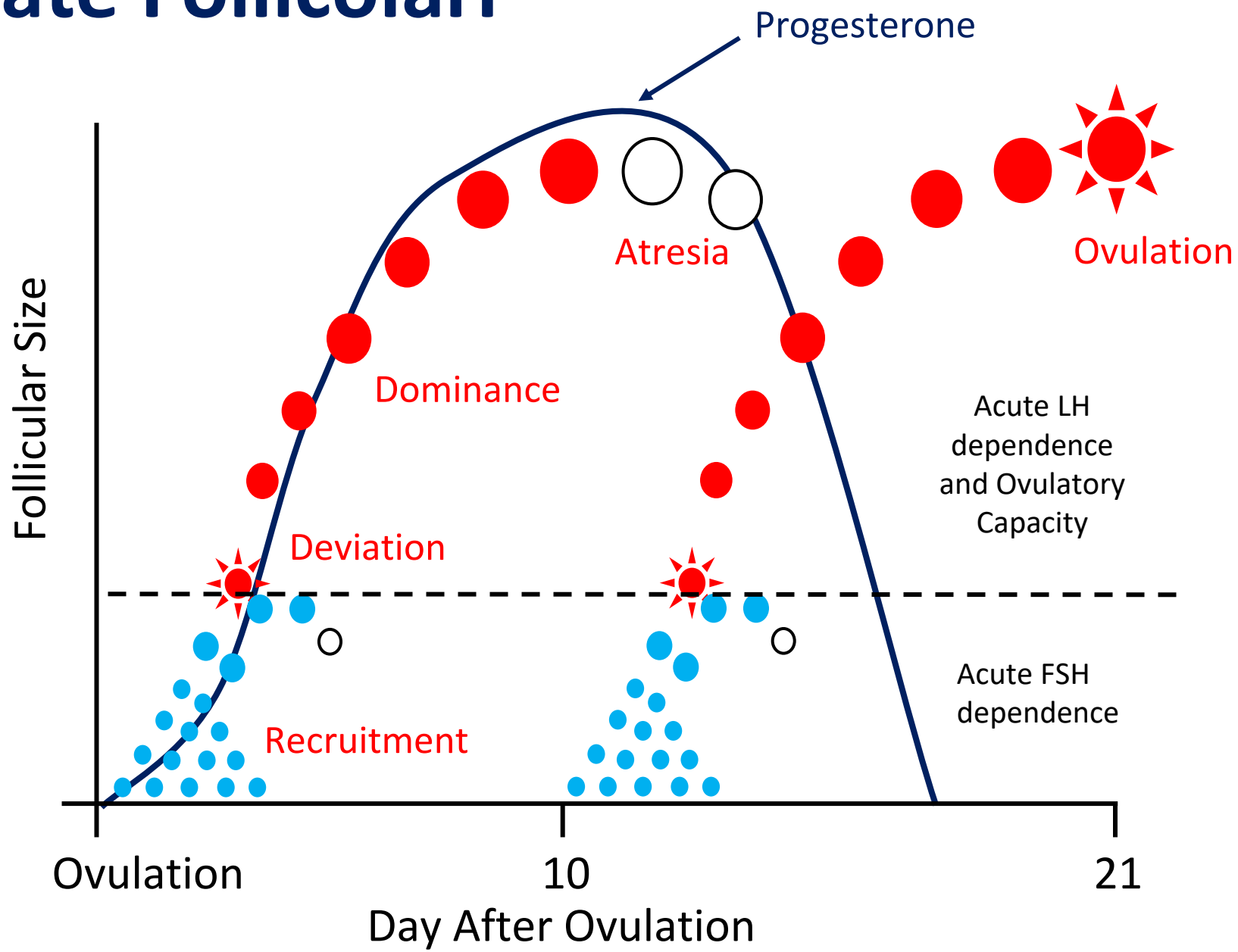
LH & FSH

Ovary

Steroid Hormones

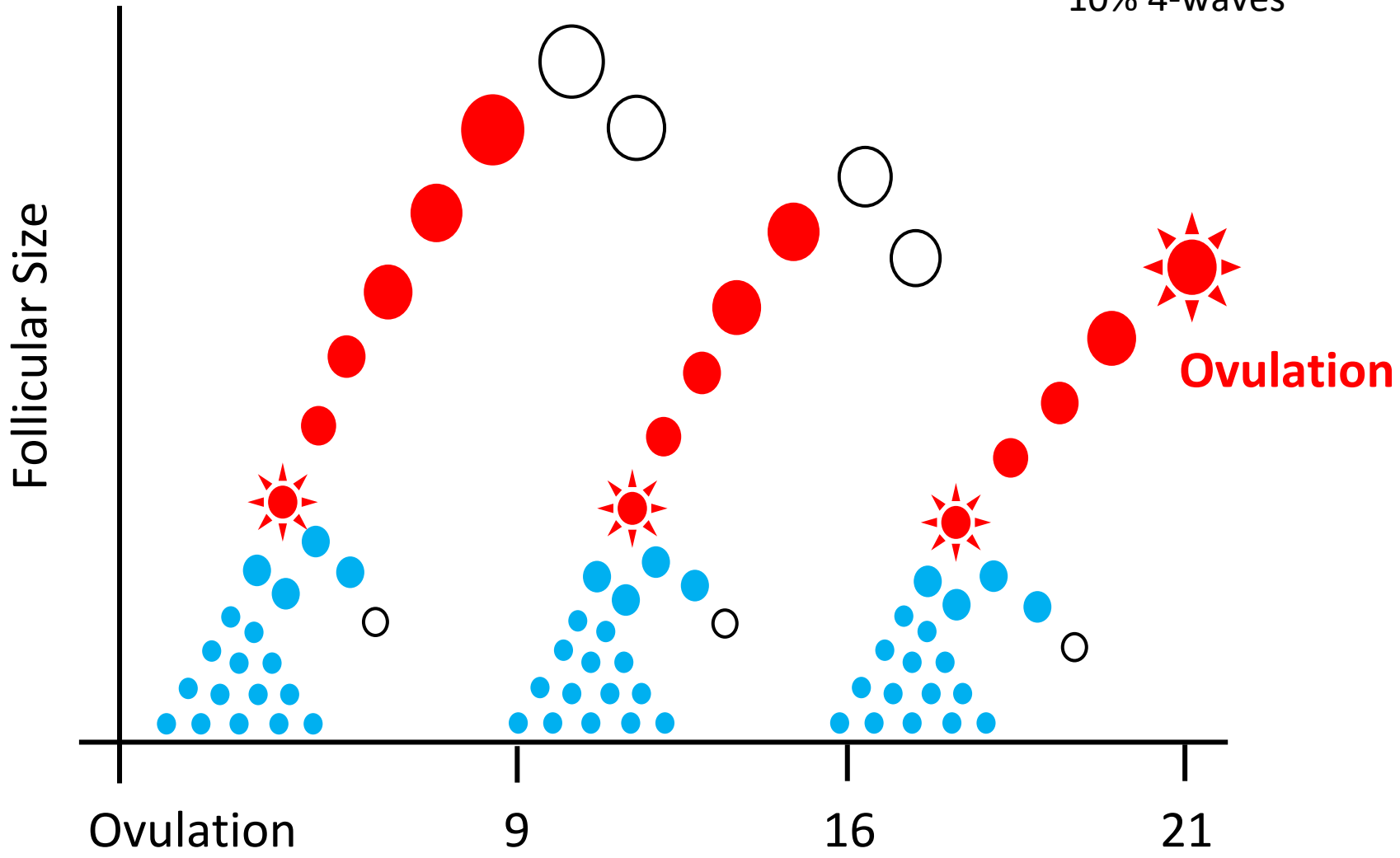
Estrogen & Progesterone

Due Ondate Follicolari



Tre Ondate Follicolari

Manze Nullipare
50% 2-waves
40% 3-waves
10% 4-waves



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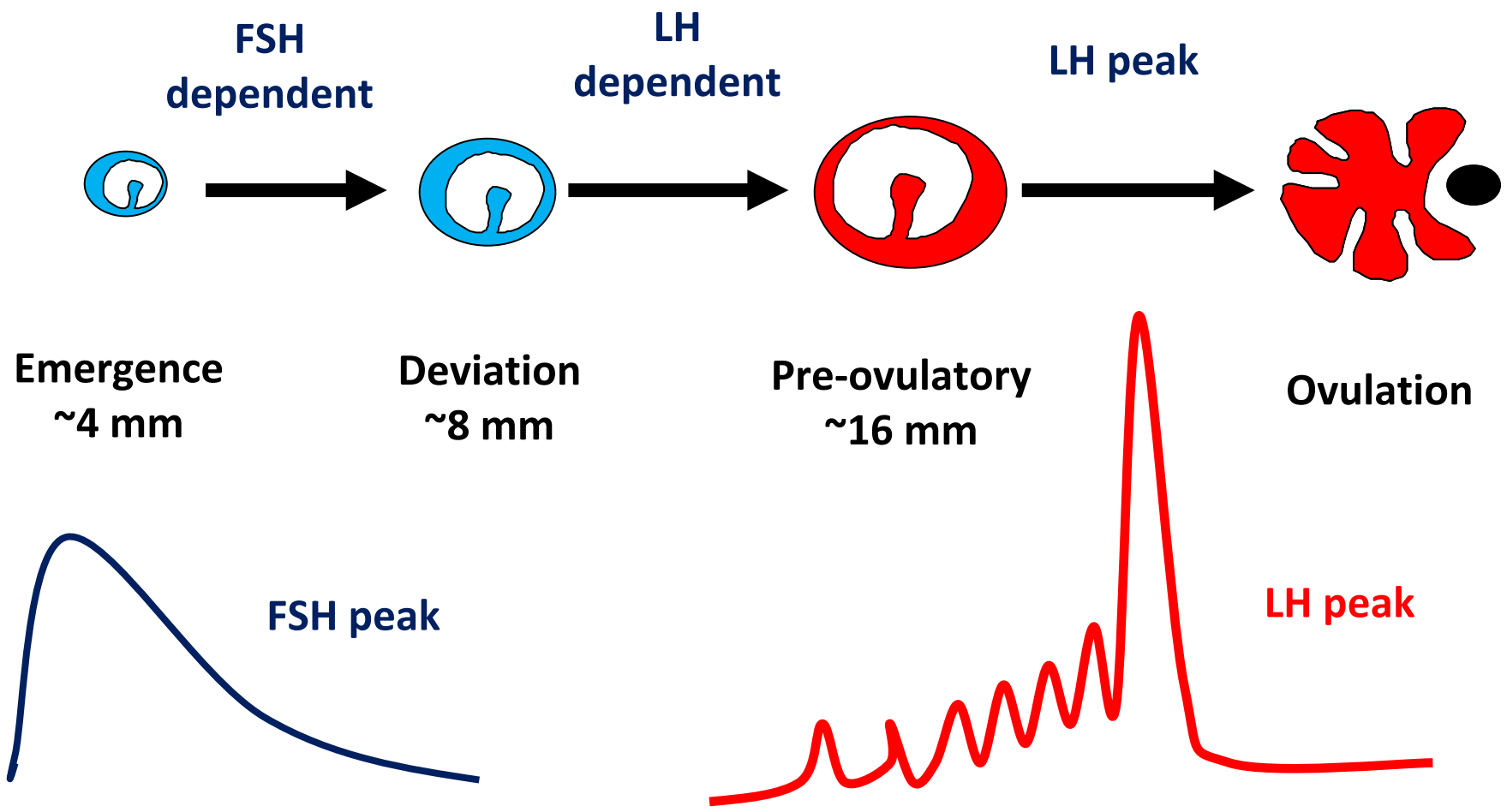
Ovulazione



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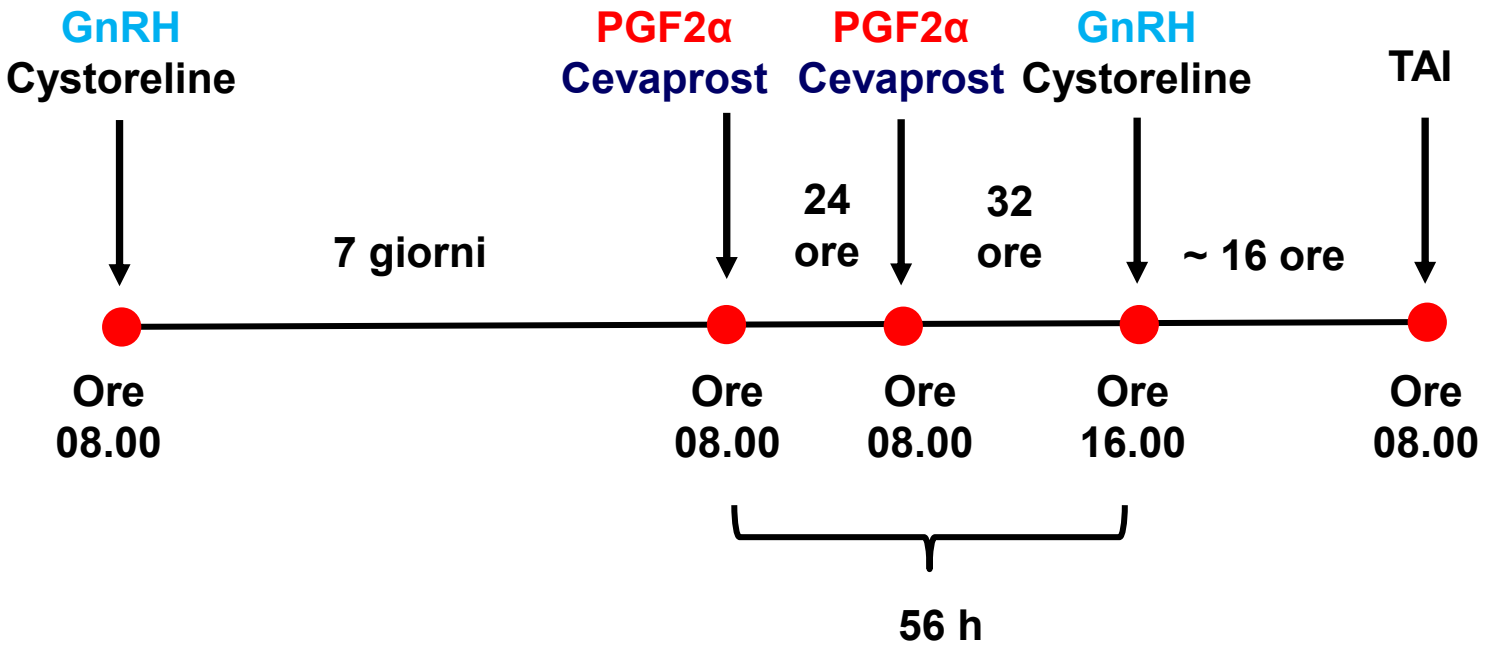
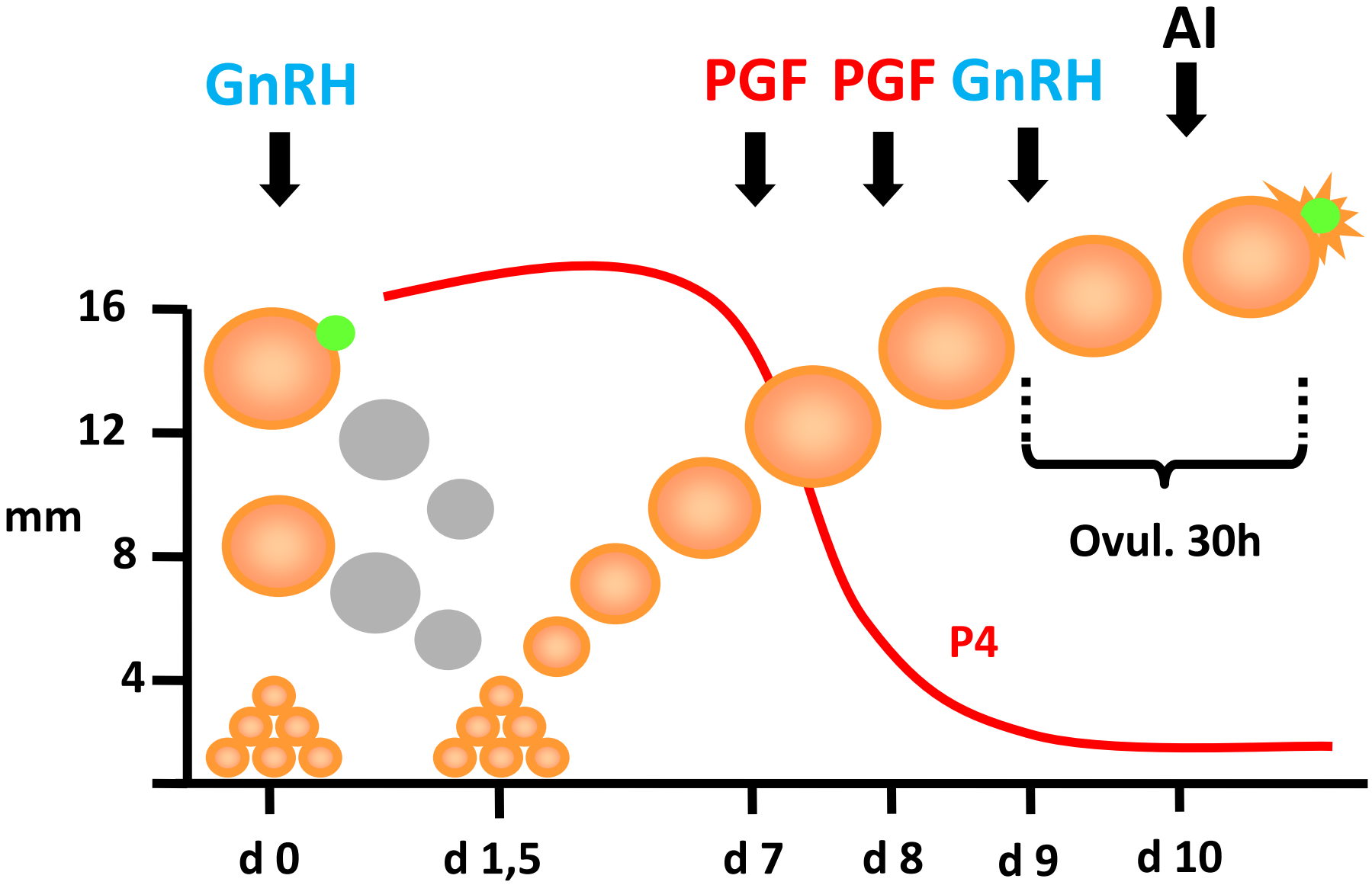
Protocollo Ovsynch® con doppia PGF

Lunedì	Martedì	Mercoledì	Giovedì	Venerdì	Sabato	Domenica
	GnRH					
	PGF	PGF	GnRH	TAI		



Follicular dynamics - Ovsynch®



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J. Dairy Sci. 101:8566–8571
https://doi.org/10.3168/jds.2017-14191

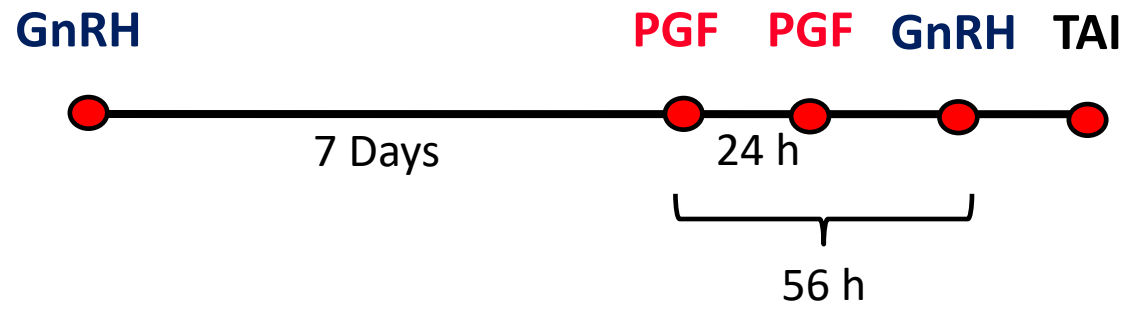
Short communication: Effect of adding a second prostaglandin $F_{2\alpha}$ injection during the Ovsynch protocol on luteal regression and fertility in lactating dairy cows: A meta-analysis

S. Borchardt,* A. Pohl,* P. D. Carvalho,† P. M. Fricke,† and W. Heuwieser*[1]
*Clinic for Animal Reproduction, Faculty of Veterinary Medicine, Freie Universität Berlin, Koenigsweg 65, 14163 Berlin, Germany
†Department of Dairy Science, University of Wisconsin, Madison 53706

Ovsynch

Double PGF (n=2689) vs Single PGF (n=2667)

5'356 Cows → Increase of **12%** complete luteolysis → Increase of **5%** **CR%** → Resulted from an increased level of fertilization rates



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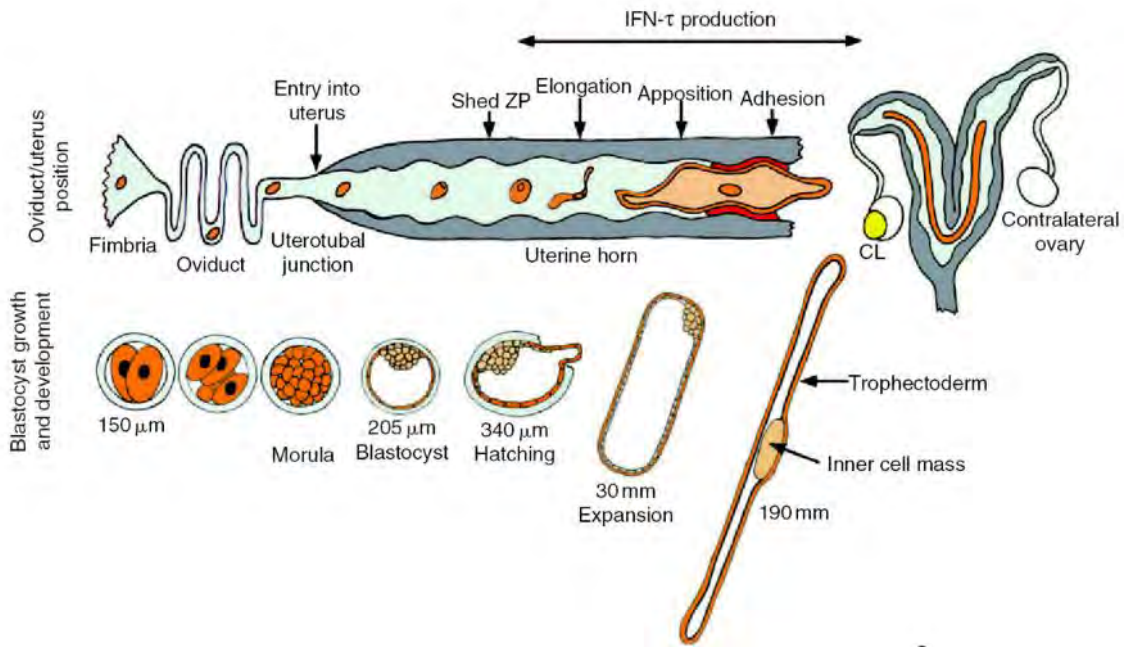
J. Dairy Sci. 105:4679–4689
https://doi.org/10.3168/jds.2021-21431

Symposium review: The implications of spontaneous versus synchronized ovulations on the reproductive performance of lactating dairy cows*

P. M. Fricke† and **M. C. Wiltbank**
Department of Animal and Dairy Sciences, University of Wisconsin-Madison, Madison 53706



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Study	TAI protocol	P/AI /%)		P-value	Difference *
		Estrus	TAI		
Pursley et al., 1997a	Ovsynch	39	37	NS	—
Pursley et al., 1997b	Ovsynch	39	38	NS	—
Chebel & Santos, 2010	Presynch-Ovsynch	33	40	0.14	—
Strickland et al., 2010	Presynch-Ovsynch	31	44	<0.01	42
Gümen et al., 2012	Presynch-Ovsynch	36	60	<0.05	67
Fricke et al., 2014	Presynch-Ovsynch	32	40	<0.01	25
Santos et al., 2017	Double-Ovsynch	39	49	<0.05	26
Sitko et al., 2019	Double-Ovsynch	49	58	<0.01	18

*Relative difference between treatments was calculated as the difference in P/AI between estrus and TAI treatments divided by P/AI for the estrus treatment.

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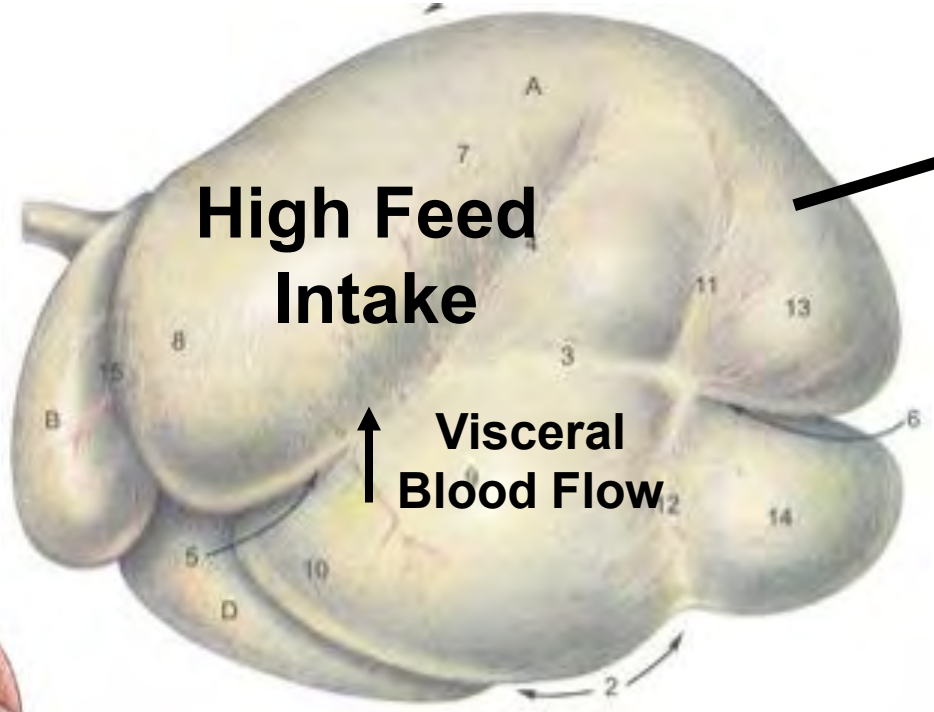
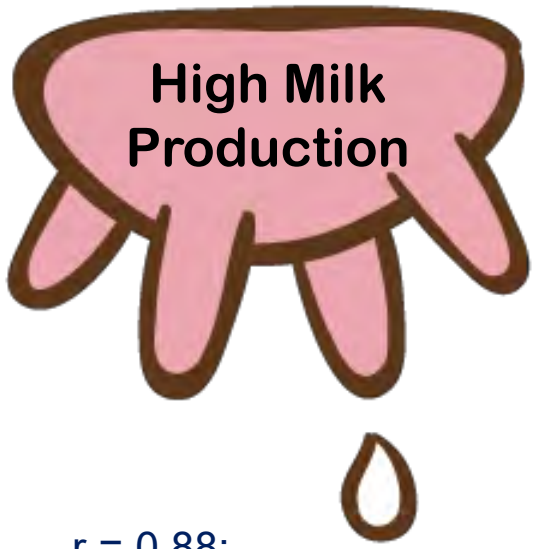
Hepatic Steroid Metabolism

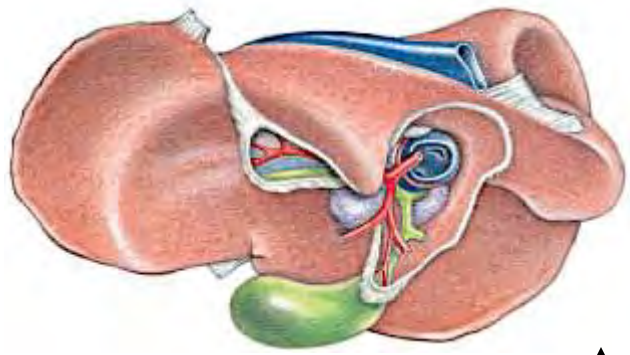
Milo Wiltbank, UW-Madison





r = 0.88;
Harrison et al.,
J. Dairy Sci.
73:2749; 1990

Liver Blood Flow



Metabolism of Ovarian Steroids

Decreased Circulating Estradiol & Progesterone

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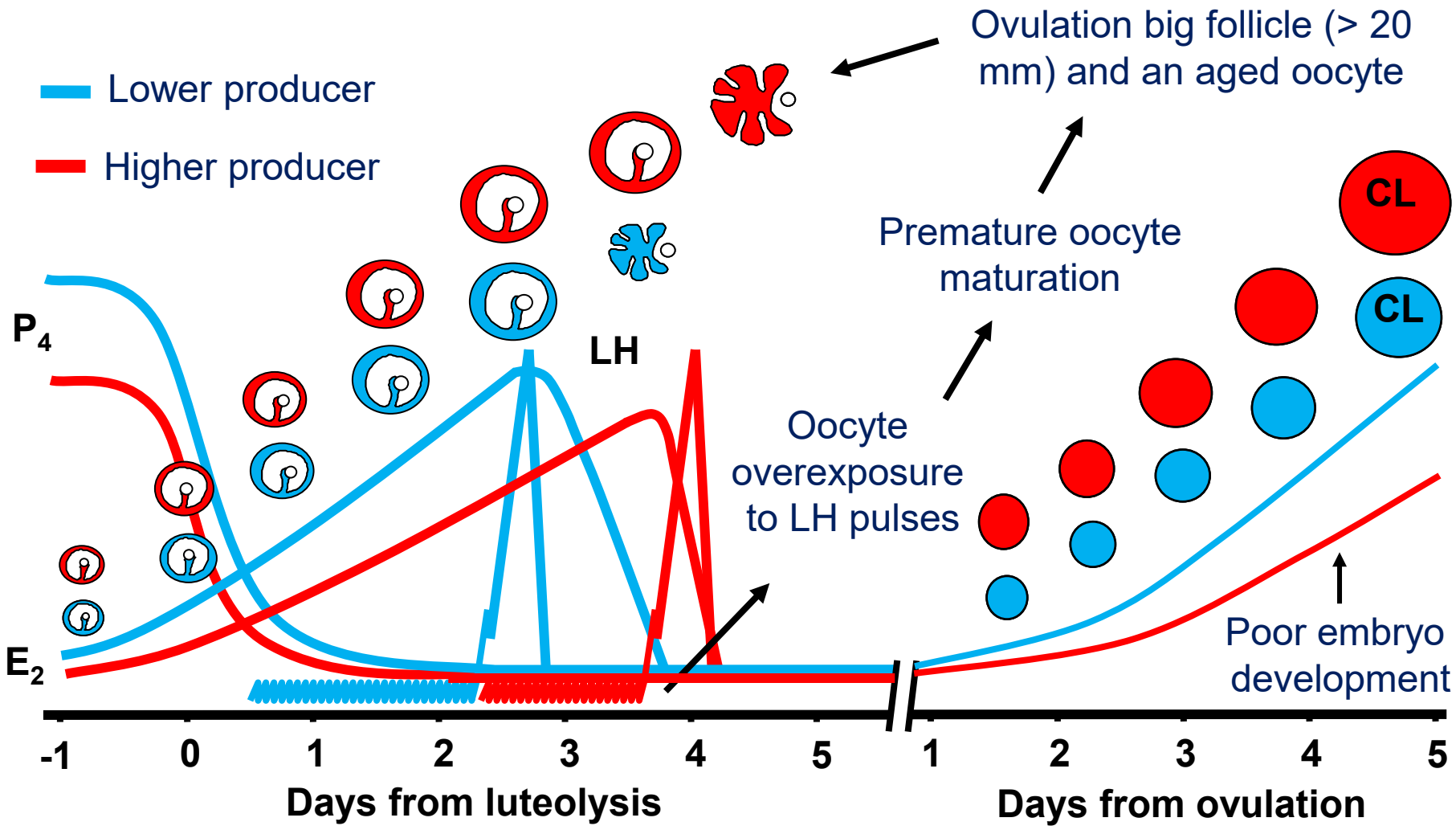
Follicular profiles in relation to milk production



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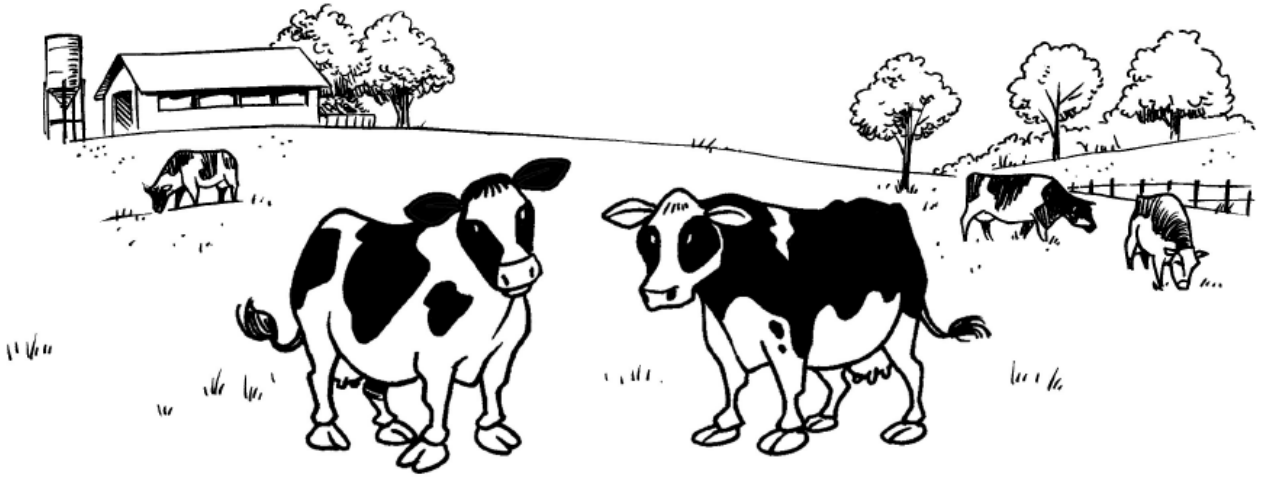
Ottimizzare la gestione riproduttiva attraverso un protocollo di sincronizzazione (G7G) della prima inseminazione artificiale

Alessio Valenza & Alex Bach



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Reproductive performance at 1st artificial insemination of dairy cows assigned to estrous detection or a Double-Ovsynch program

A Valenza[1] and A. Bach[2,3]

[1]Ceva Animal Health, Italy; [2]Marlex Research and Education, Barcelona, Catalonia; [3]ICREA, Barcelona, Catalonia

INTRODUCTION

- Milk production of a dairy herd is partially affected by the rate at which cows become pregnant, which is influenced by AI service rate and fertility, especially for 1st AI

OBJECTIVE

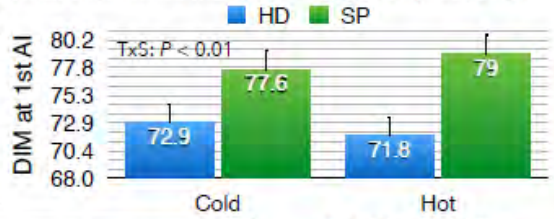
- To to determine effectiveness in promoting pregnancy at 1st AI of a synchronization protocol for fix-timed AI vs AI based on natural heats

MATERIALS AND METHODS

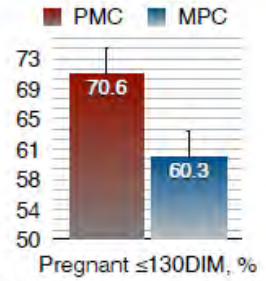
- At calving, 2,500 Holstein cows from 5 farms were randomly allocated to:
  - **1)** breeding based on heat detection (**HD**; 1,276 cows, 30% primiparous cows (PMC))
  - **2)** using a synchronization program (**SP**; 1,224 cows, 32% PMC).
- Cows were enrolled between July 2021 and December 2022. Cows on HD were bred whenever detected on heat using an accelerometer if DIM > 50, and those not showing estrous by 70 DIM (51%) were synchronized using either prostaglandin (PG) or an Ovsynch protocol
- SP cows received an injection of PG between 52 and 59 DIM followed by a GnRH 3 d later; then 7 d later, the first GnRH of Ovsynch (GnRH on d 0; PG on d 7 and 8; GnRH on d 9, and AI 16 h after second GnRH). First service was performed between 73 and 80 DIM
- After 1st, open cows were either re-bred if detected in estrous or after a synchronization protocol (Ovsynch)
- Cows were checked for pregnancy by ultrasound at 32 and 68 d post-breeding. DIM at 1st AI, pregnancy to AI rate (P/AI), DIM at pregnancy, pregnancy losses, and proportion of cows pregnant by 130 DIM was calculated
- The effect on P/AI, pregnancy losses, and cows pregnant by 130 DIM of the reproductive scheme, parity, season (hot: June to October (OJO% cows), or cold: November to May) was assessed using a mixed-effects logistic regression model with the random effect of herd. The effect on DIM at 1st AI was analyzed using a general mixed-effects model.

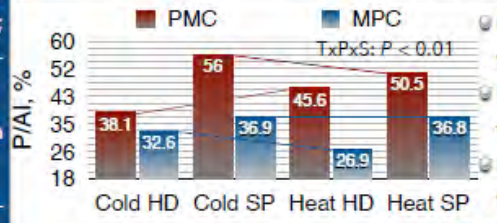
- Average days dry was 67.4±24.6. P/AI at 1st AI tended (P =0.08) to be greatest when days dry < 55
- 4.2% of cows calved twins. Cows that carried twins (n=106) tended (P = 0.10) to have a lower risk (OR = 0.72; 95% CI =[0.47-1.10]) to conceive at 1st AI than cows that had singletons (n=2,394)

Disease	OR (ill vs healthy)	95% CI	*P*-value
Metritis	0.76	0.55-1.05	0.09
Milk fever	0.52	0.29-0.94	**0.02**
Lame	0.70	0.54-0.91	**<0.01**
Ketosis	0.78	0.40-1.52	0.46
Mastitis	0.89	0.71-1.10	0.27
Retained Placenta	0.63	0.45-0.88	**<0.01**

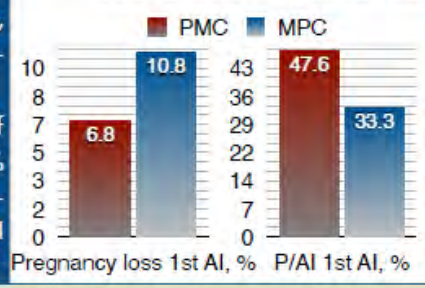


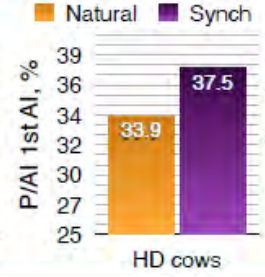
	Treatment		*P*-value		
	HD	SP	Treatment	Parity	Season
DIM at 1st AI	72.4±1.63	78.3±1.63	**<0.01**	0.37	0.81
P/AI at 1st AI, %	35.8	45.1			
	OR =1.42 (1.20-1.67)		**<0.01**	**<0.01**	0.36
Pregnancy loss at 1st AI, %	9.37	8.26			
	OR = 0.89 (0.59-1.35)		0.76	**0.03**	0.17
Cows pregnant ≤ 130 DIM, %	63.6	67.3	**0.05**	**<0.01**	0.35
	OR = 1.8 (1.08-1.36)				

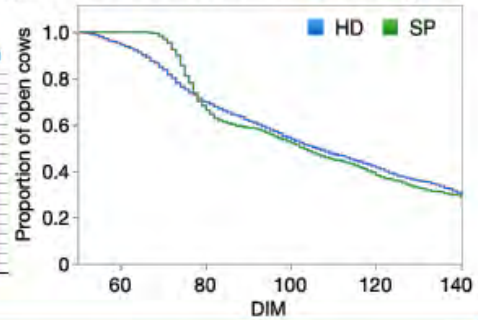




- MPC on SP had the same P/AI during hot and cold weather, but lower with hot weather and HD
- PMC on HD did better and MPC on HD worse in hot weather
- PMC in SP had greater P/AI than PMC on SP during hot weather

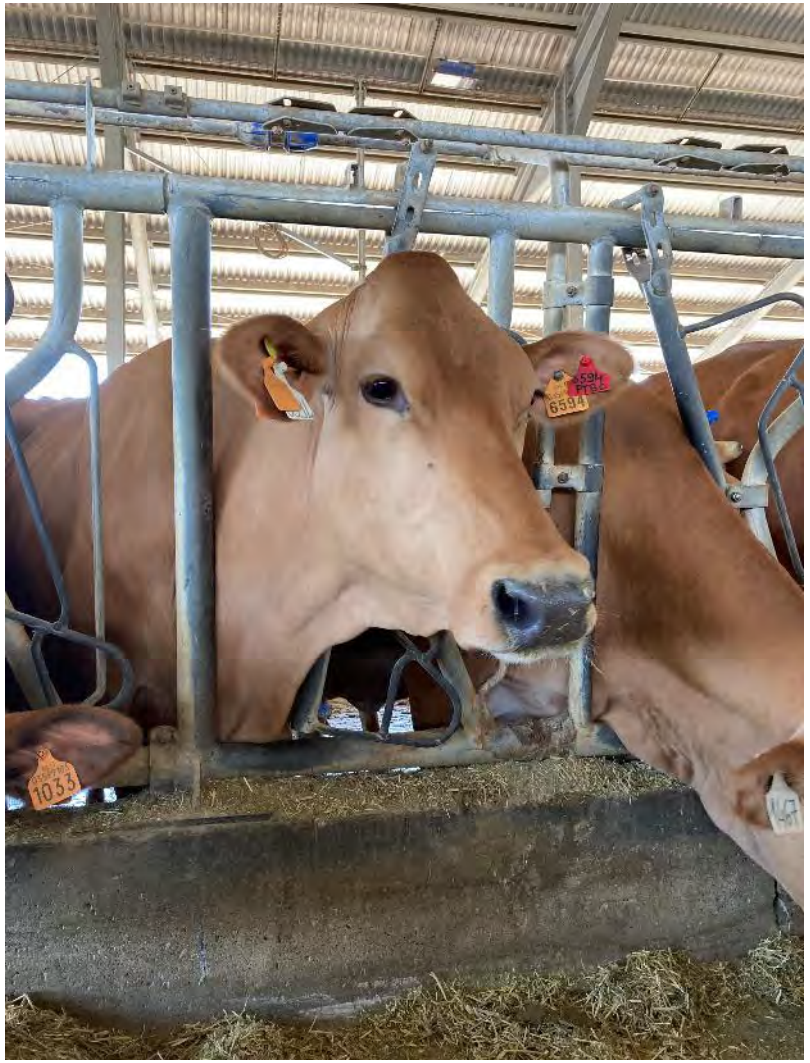






CONCLUSIONS

- Fixed-timed AI programs for 1st AI yield more P/AI than those based on estrous detection using accelerometers, and HD requires 51% of the cows to be synchronized
- Cows that experience postpartum milk Fever, retained placenta, and lameness have lower fertility at 1st AI regardless of the reproductive program
- Cows on HD got serviced 7 d earlier than SP cows, but at 130 DIM, a greater number of SP cows reached pregnancy



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Materiali e Metodi

1. Al parto, 2.500 vacche Holstein provenienti da 5 allevamenti da latte sono state assegnate in modo casuale ai seguenti protocolli:
   - ✓**Detenzione dell'estro (HD)** dove la 1°FA è basata prevalentemente sulla rilevazione del calore (**1.276 vacche**, 30% primipare (PMC))
   - ✓**Protocollo di sincronizzazione (SP)** dove la 1° FA avviene tramite un programma di sincronizzazione dell'ovulazione (**1.224 vacche**, 32% PMC);
3. Le vacche sono state arruolate tra luglio 2021 e dicembre 2022 ed i dati riproduttivi e produttivi sono stati raccolti fino ad agosto 2023.

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Double Ovsynch modificato (G7G)

Dom	Lun	Mar	Mer	Gio	Ven	Sab
					GnRH	
					PGF	
	GnRH					
	GnRH					
	PGF	PGF	GnRH	TAI		

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Souza et al., 2008

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Obiettivi, Materiali e Metodi

1. Dopo la 1° FA, le vacche vuote sono state ri-fecondate dopo 21 gg se rilevate in estro o dopo PGF o protocollo di sincronizzazione (Ovsynch);
2. La diagnosi di gravidanza è stata fatta dal veterinario aziendale mediante ecografia a 32 + 7 giorni dopo la FA e riconfermata a 68 giorni .
3. Tutti i dati raccolti sono stati analizzati per calcolare:
   - ✓ **Giorni in latte al prima IA**
   - ✓ **tasso gravidanza (concepimento) per IA (P/AI)**
   - ✓ **effetto delle patologie sulla riproduzione e**
   - ✓ **percentuale di vacche gravide entro 130 giorni in latte**

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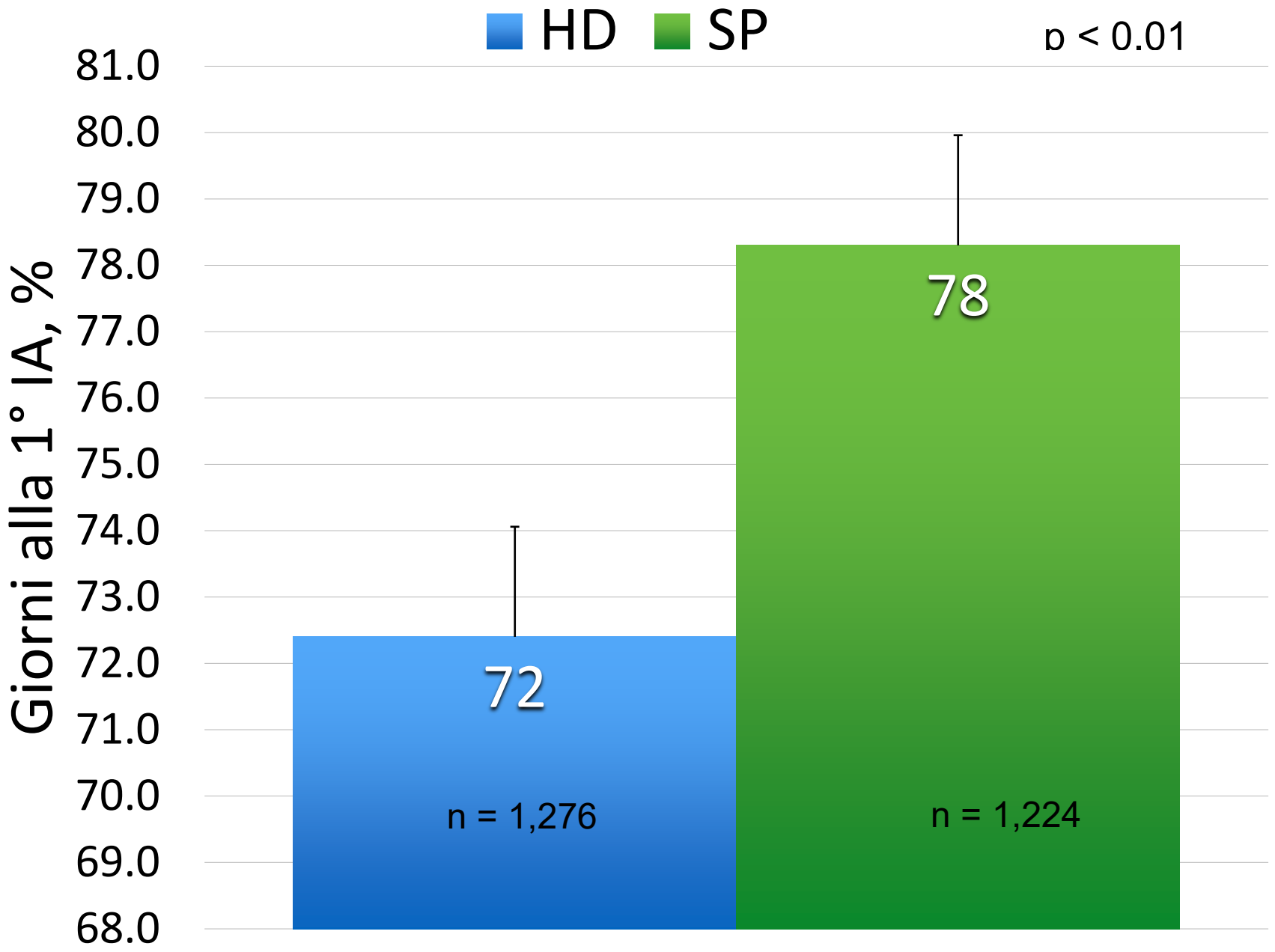

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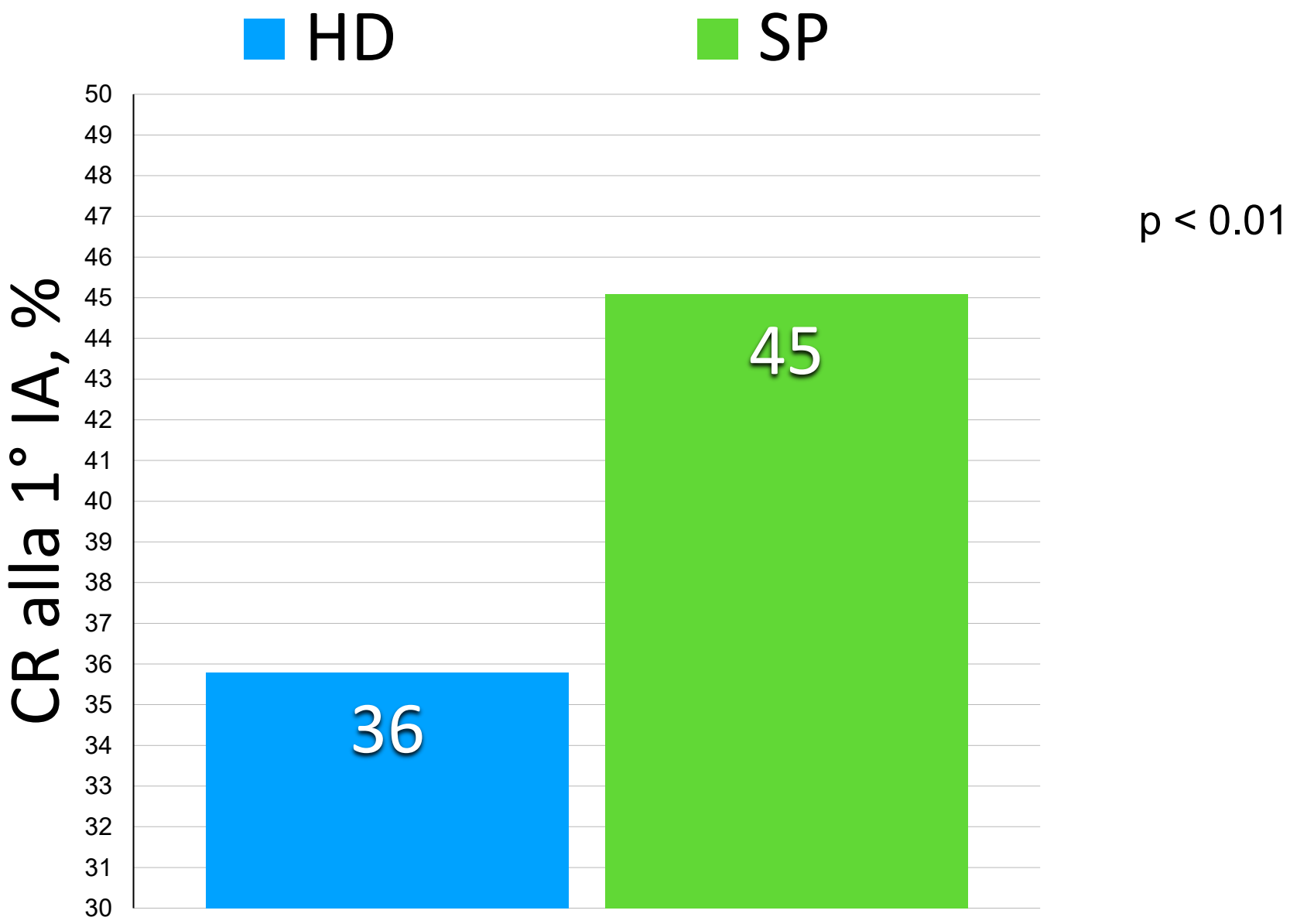

$p < 0.01$

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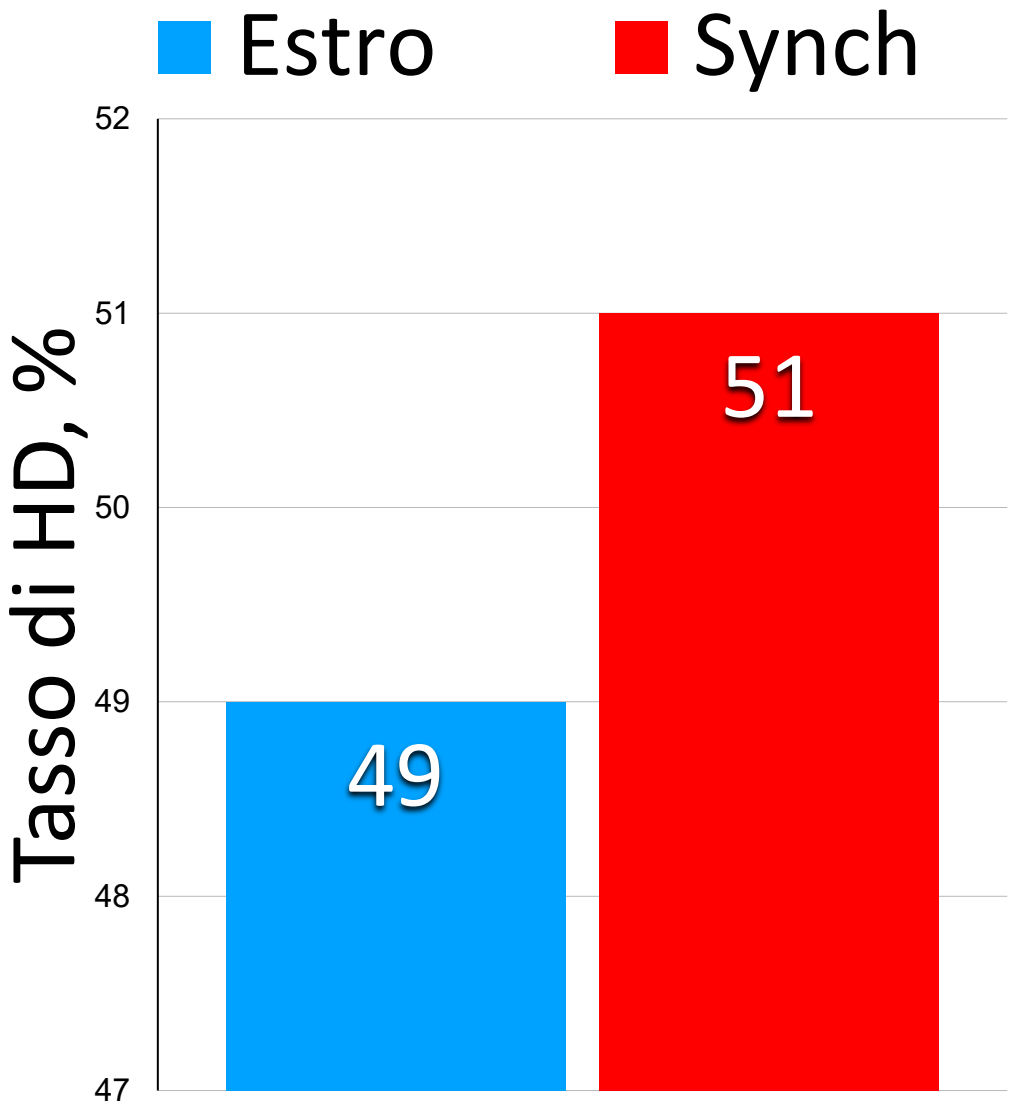

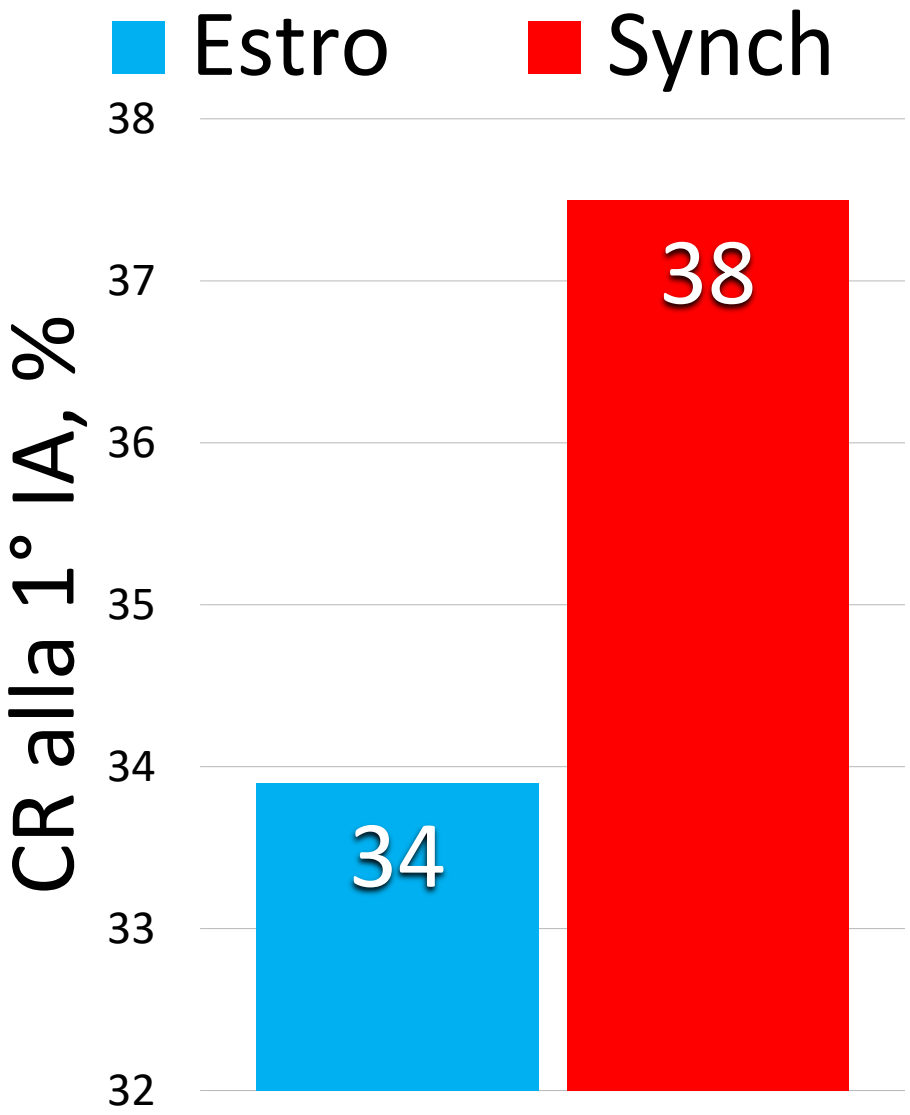

Vacche gruppo HD

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Tasso di concepimento alla 1° IA

Level	Least Sq Mean	Std Error	Mean
CA	0.48936877	0.02260899	0.460084
CI	0.39378343	0.01992023	0.361801
OR	0.34688995	0.02392151	0.310811
PE	0.36011893	0.02011076	0.356633
RO	0.43612637	0.03942114	0.406250

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Treatment	1	1	1.7167447	7.1570	0.0076*
Herd	4	4	5.7505396	6.3537	<.0001*
Parity	1	1	9.8353771	43.4682	<.0001*
Herd*Parity	4	4	3.3697420	3.7232	0.0050*

Level	Least Sq Mean	Std Error	Mean
1	0.48258110	0.01925546	0.475325
2	0.32793388	0.01339469	0.325043

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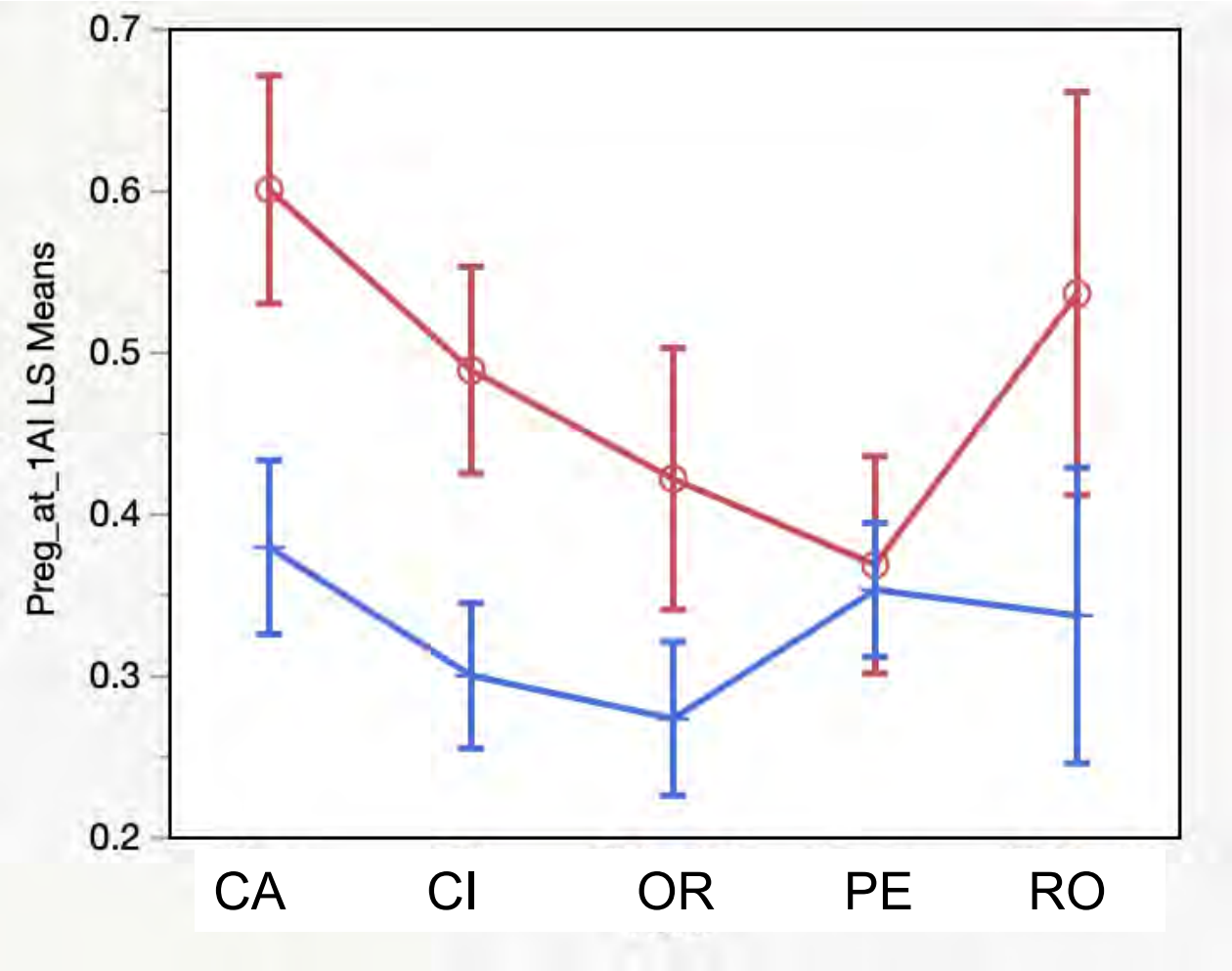
Level	Least Sq Mean	Std Error
CA SP	0.60000000	0.03595762
CA HD	0.37873754	0.02741743
CI SP	0.48826291	0.03259268
CI HD	0.29930394	0.02291244
OR SP	0.42105263	0.04124621
OR HD	0.27272727	0.02424262
PE SP	0.36787565	0.03423980
PE HD	0.35236220	0.02110465
RO SP	0.53571429	0.06356469
RO HD	0.33653846	0.04664373



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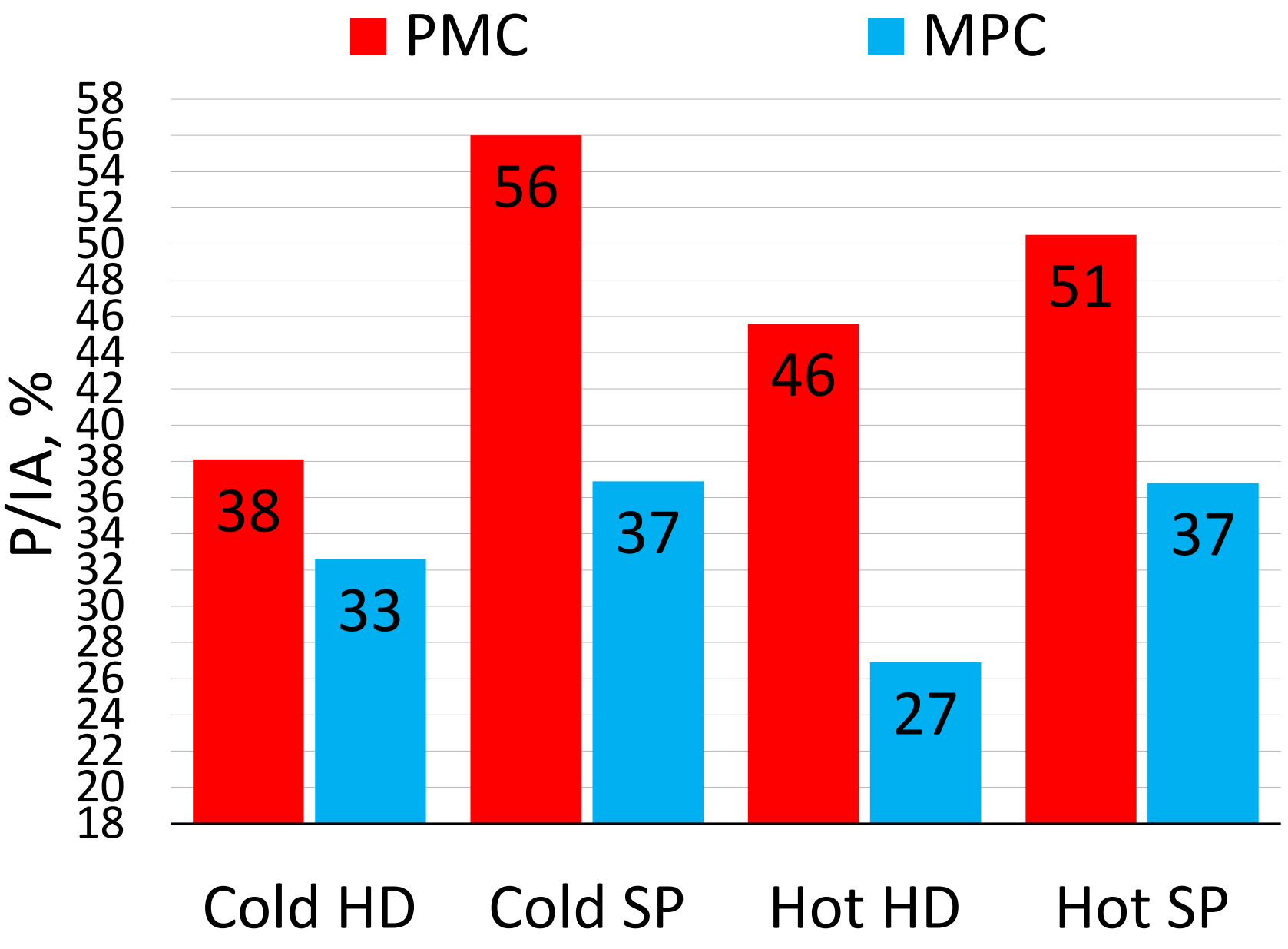

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Effetto delle patologie post-partum

Patologia	OR (malato vs. sano)	95% CI	*P*-value
Ritenzione placenta	0.63	0.45 – 0.88	**<0.01**
Collasso puerperale	0.52	0.29 – 0.94	**0.02**
Patologia podale	0.70	0.54 – 0.91	**<0.01**
Metrite	0.76	0.55 - 1.05	0.09
Chetosi	0.78	0.40 – 1.52	0.46
Mastite	0.89	0.71 – 1.10	0.27

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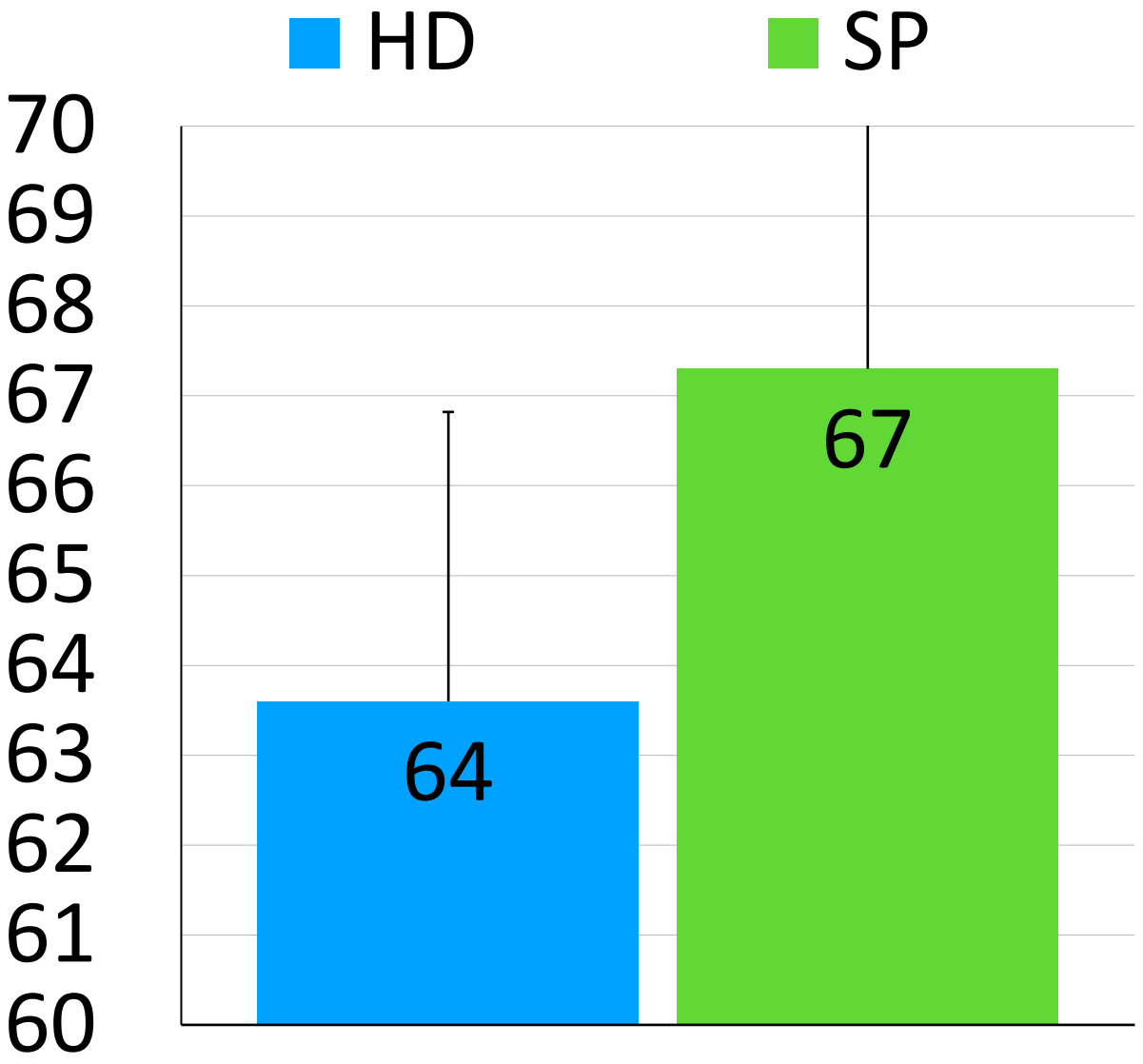
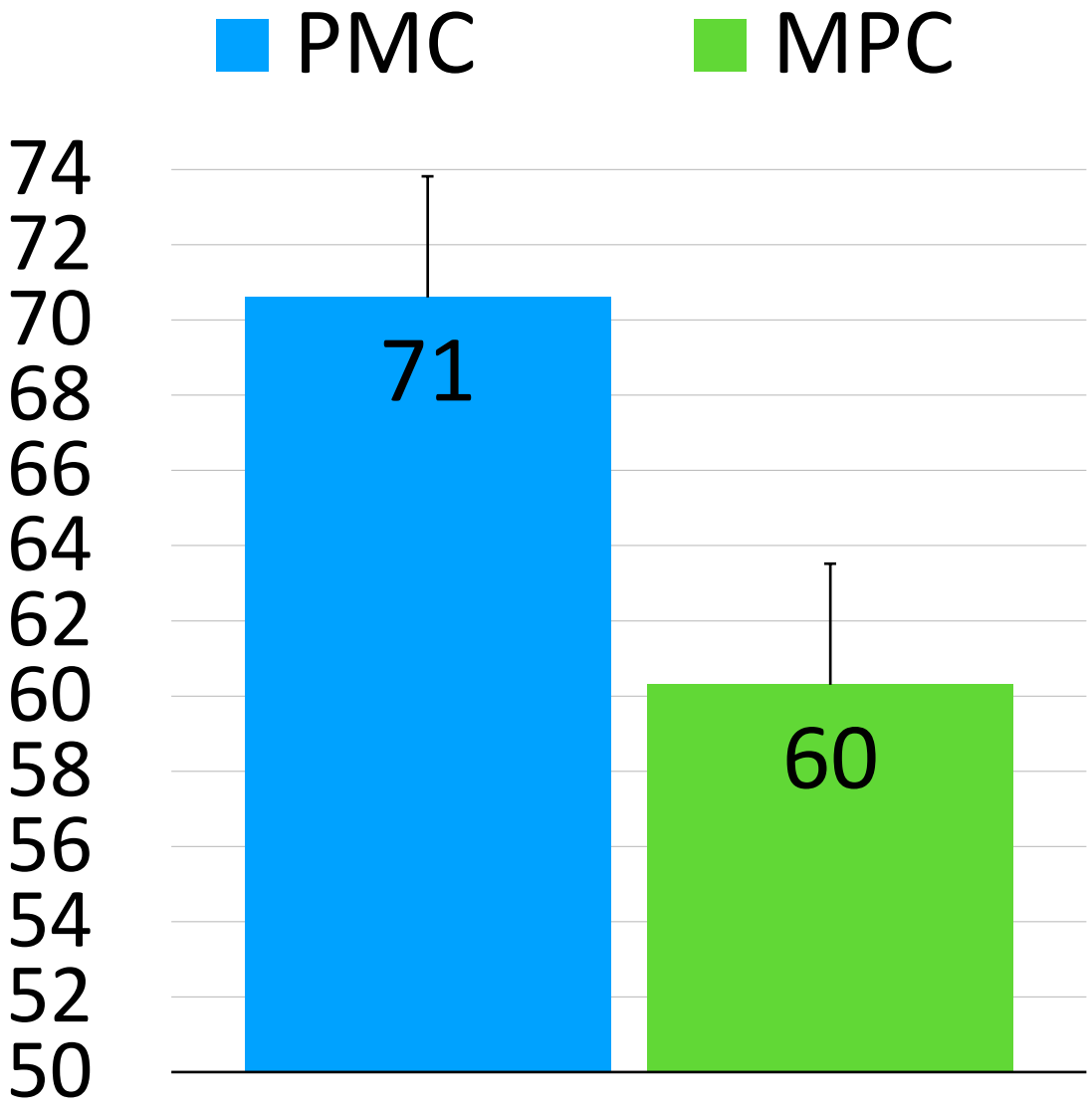
p = 0.05



Gravide ≤ 130 gg in latte, %



Gravide ≤ 130 gg in latte, %

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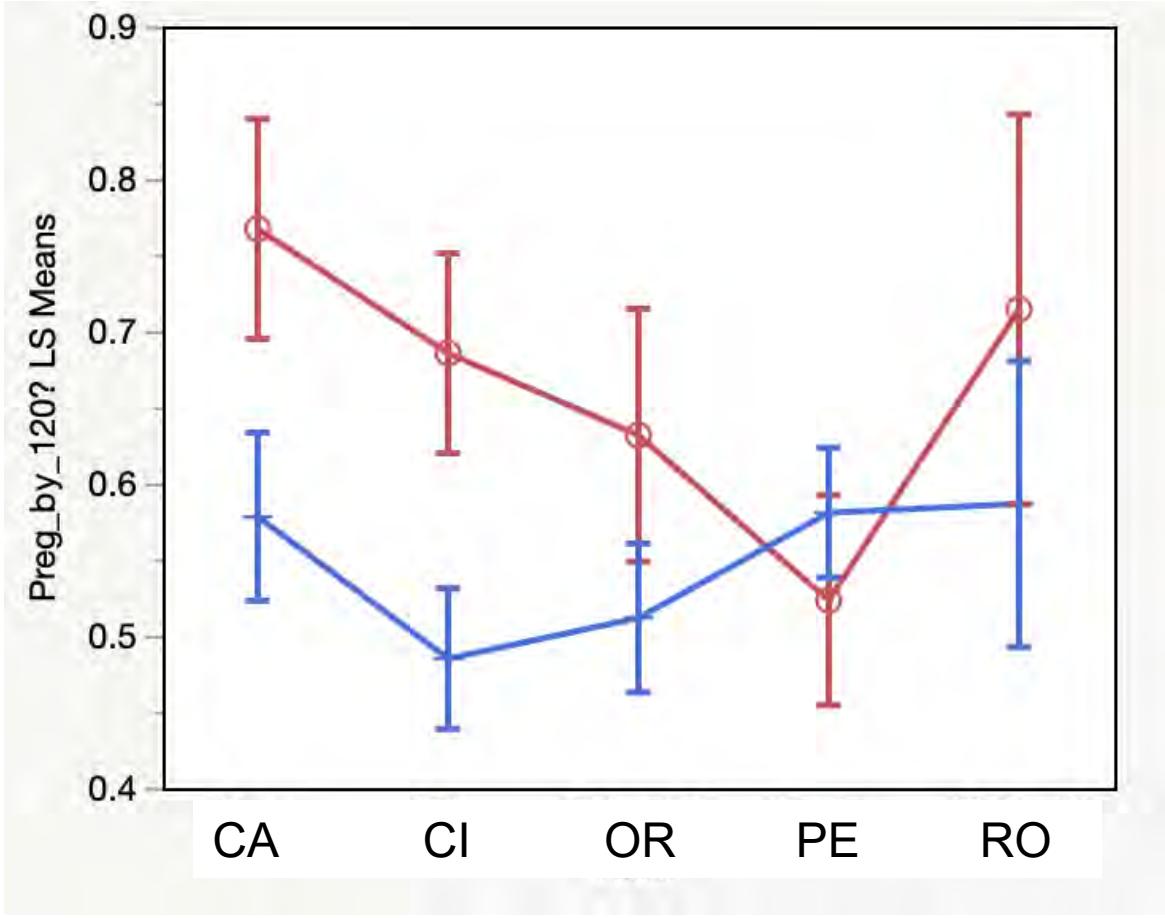
Response Preg by 130 DIM

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Herd	4	4	4.4178089	4.6292	0.0010*
Parity	1	1	5.5318790	23.1864	<.0001*
Herd*Parity	4	4	5.8009912	6.0786	<.0001*

Level	Least Sq Mean	Std Error	Mean
CA	0.67255927	0.02317444	0.647799
CI	0.58518240	0.02045522	0.551242
OR	0.57163363	0.02456396	0.542471
PE	0.55201236	0.02065086	0.564907
RO	0.65041209	0.04047986	0.631250



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Conclusioni

1. Un programma di sincronizzazione a tempo fisso per la 1° FA (**G7G o Double-Ovsynch**) produce più gravidanze rispetto alla rilevazione dell'estro mediante accelerometro, inoltre il **51%** delle vacche non sono rilevate in estro entro i 70 gg in latte e devono poi essere sincronizzate.
2. Le vacche che soffrono di collasso puerperale, ritenzione di placenta e zoppia hanno una fertilità inferiore alla 1° FA, indipendentemente dal programma riproduttivo utilizzato;
3. **Le vacche nel gruppo HD anche se hanno ricevuta la 1° FA 7 giorni prima rispetto alle vacche nel gruppo SP, a 130 DIM, un numero maggiore di vacche è rimasto gravido nel gruppo SP.**

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Diagnosi di non-gavidanza e strategie di resincronizzazione

Una diagnosi precoce di non-gravidanza consente:

1) **L'identificazione delle vacche vuote (32 giorni dopo la precedente FA) insieme**
2) **All'utilizzo di una strategia corretta per rifecondare le vacche rapidamente.**

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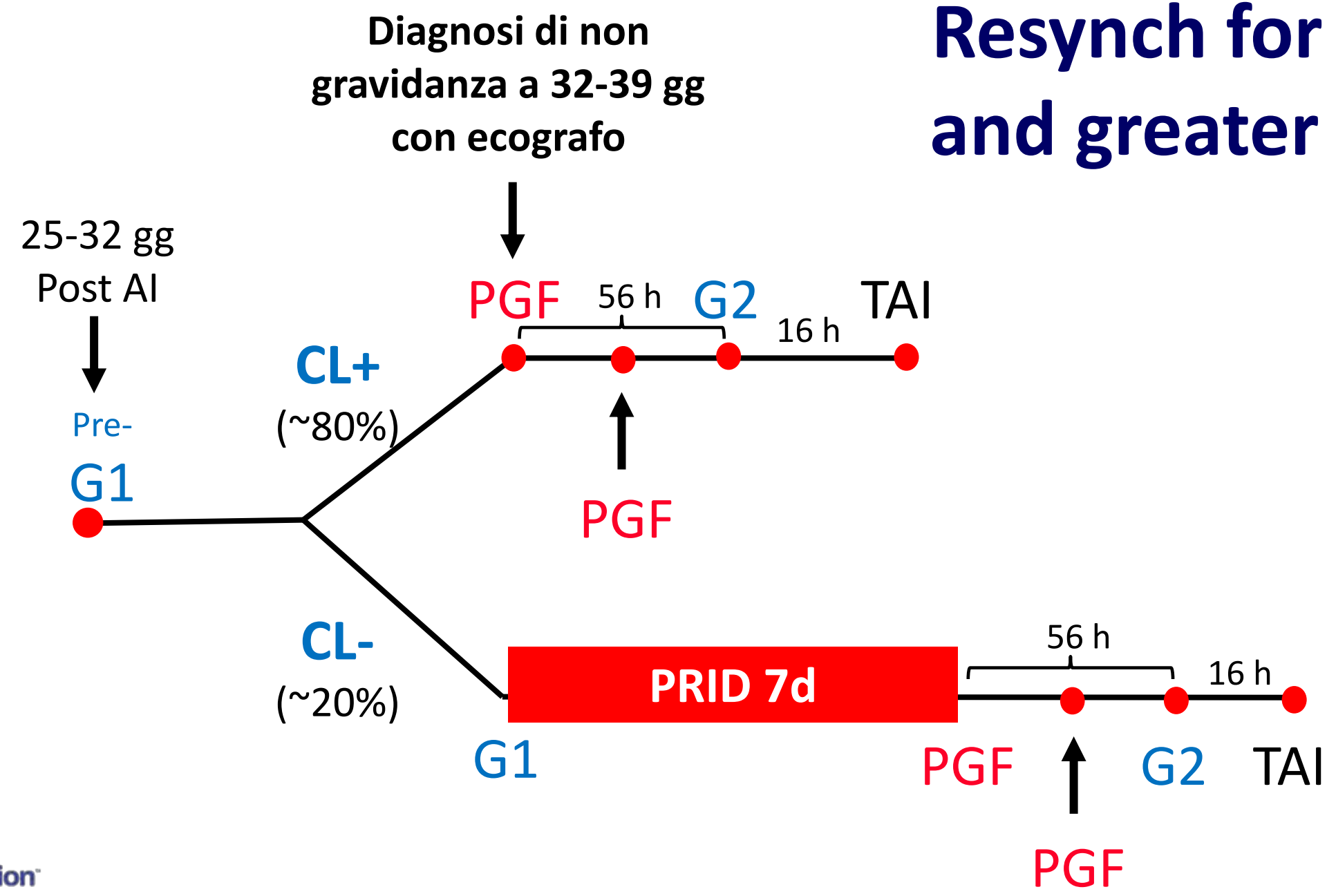
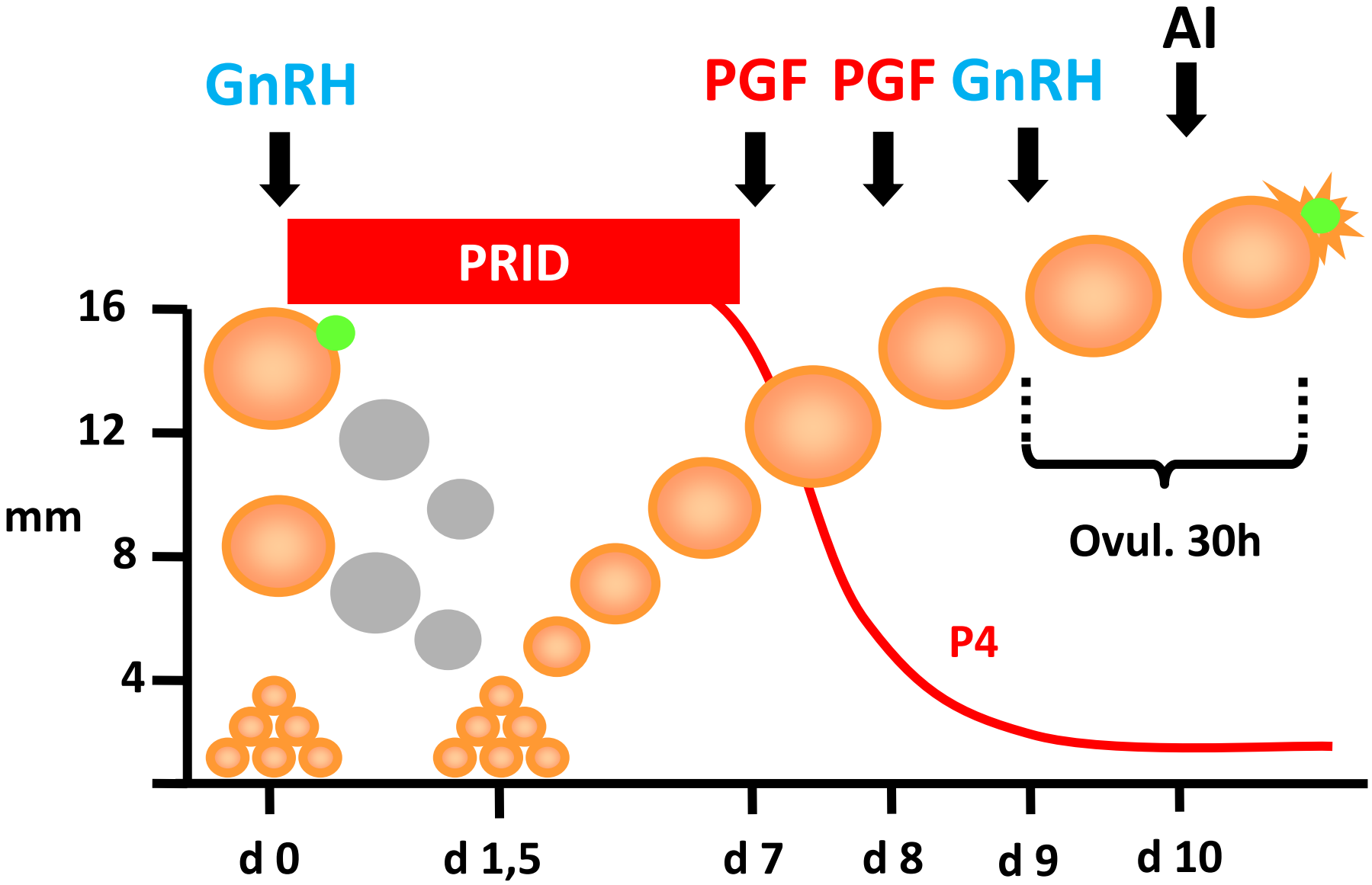
Resynch for 2nd and greater TAI



Follicular dynamics – Anovular condition



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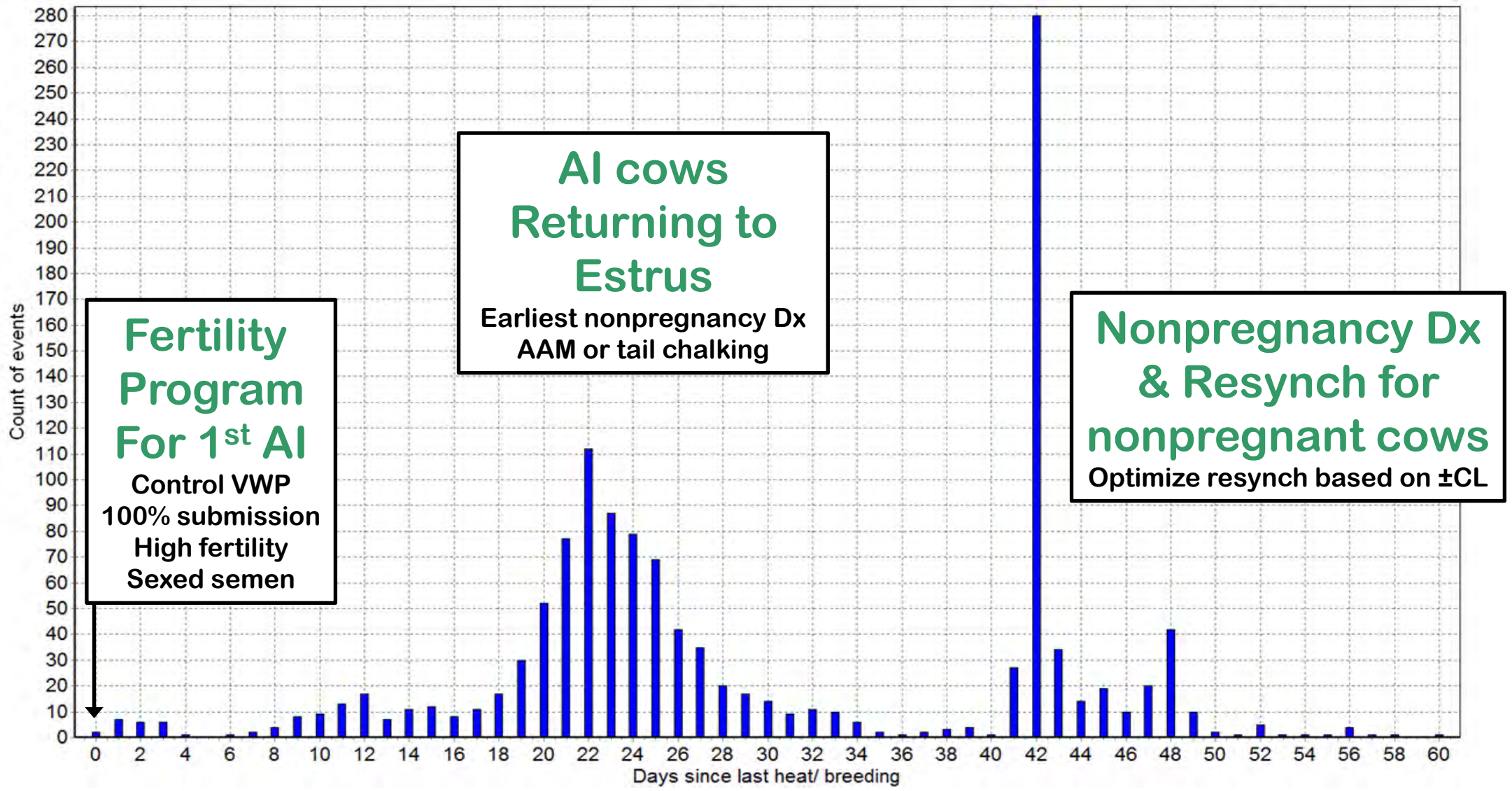
Combining Fertility Programs and Estrus



Fertility Program For 1st AI

Control VWP
100% submission
High fertility
Sexed semen

AI cows Returning to Estrus

Earliest nonpregnancy Dx
AAM or tail chalking

Nonpregnancy Dx & Resynch for nonpregnant cows

Optimize resynch based on ±CL

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
					GnRH	
					PGF	
	GnRH					
	GnRH					
	PGF	PGF	GnRH	TAI	55%	
d3						
d10						
d17						
d24	GnRH					
d31	PGF	PGF	GnRH	TAI	40%	
d38	If no CL (20%) start Ovsynch with PRID					

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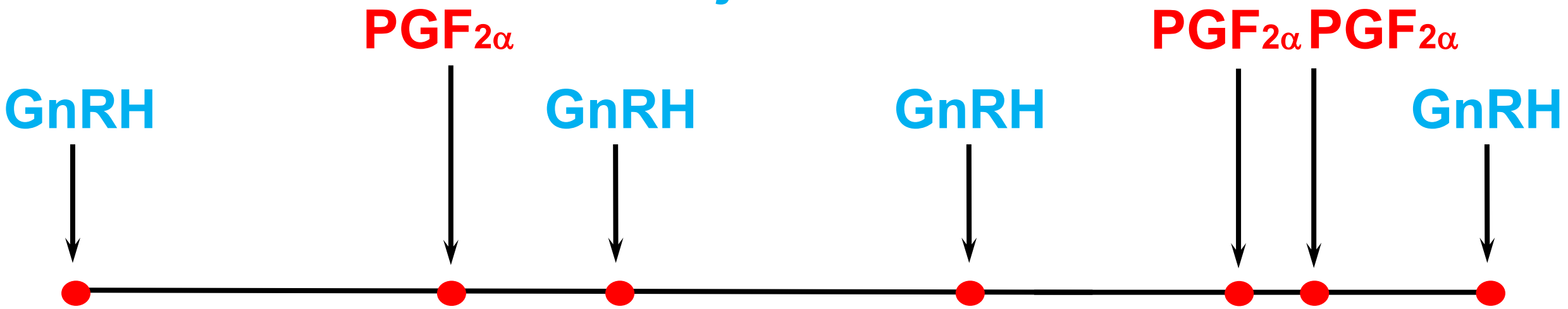
Compliance – Double Ovsynch®

On any given day, 95% of your cows get the correct injection



0.95 x 0.95 x 0.95 x 0.95 x 0.95 x 0.95 x 0.95 = **70%**

0.9 x 0.9 x 0.9 x 0.9 x 0.9 x 0.9 x 0.9 = **48%**

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J. Dairy Sci. 108:8945–8958
https://doi.org/10.3168/jds.2025-26428

Effect of timing of artificial insemination with conventional or sex-sorted semen on fertility of lactating dairy cows

V. G. Santos,[1,2]* P. D. Carvalho,[3,4] A. H. Souza,[3] S. Priskas,[5] J. A. L. Castro,[1] A. M. F. Pereira,[1,2] P. J. Ross,[4] J. Moreno,[4] M. C. Wiltbank,[3] and P. M. Fricke[3]

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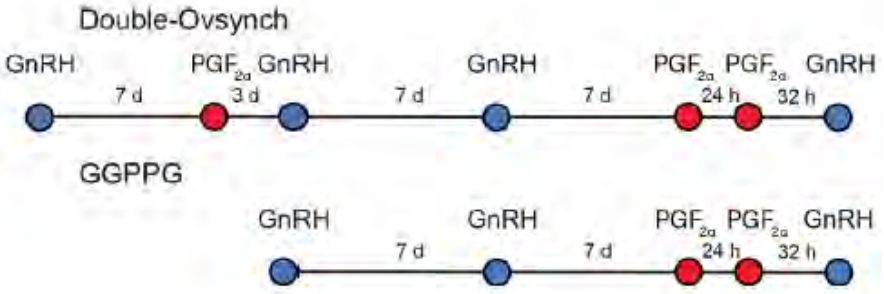

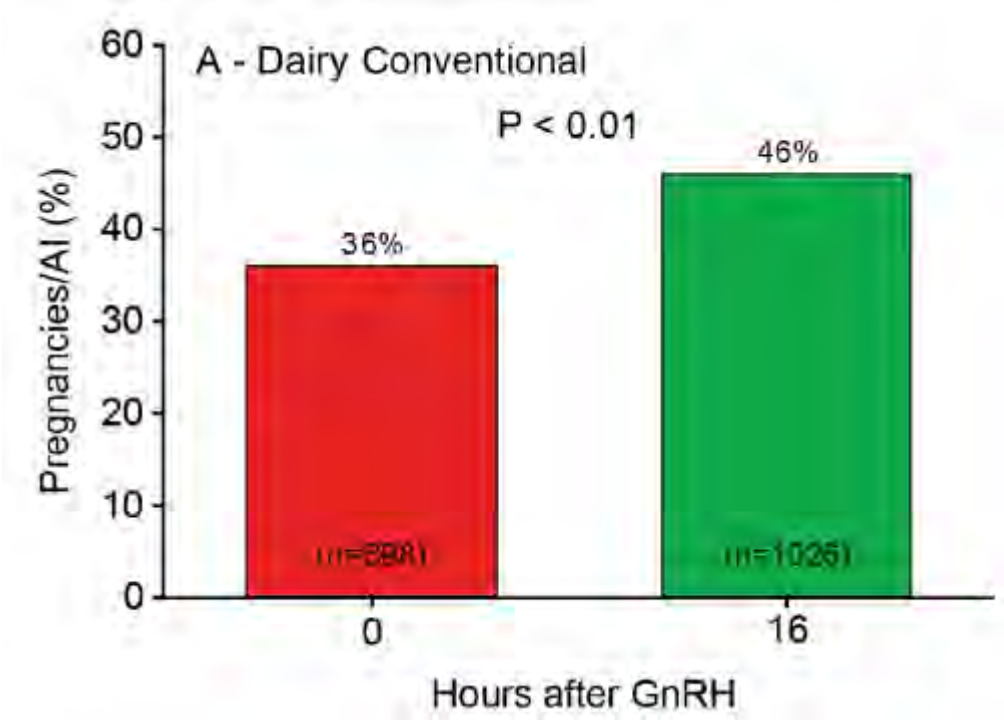

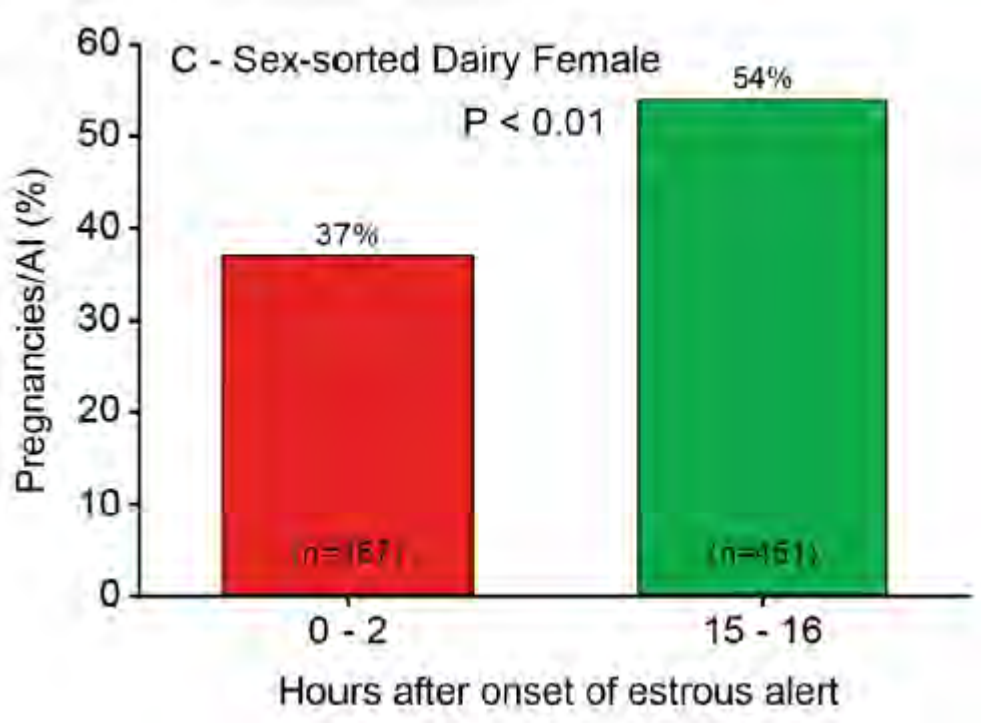

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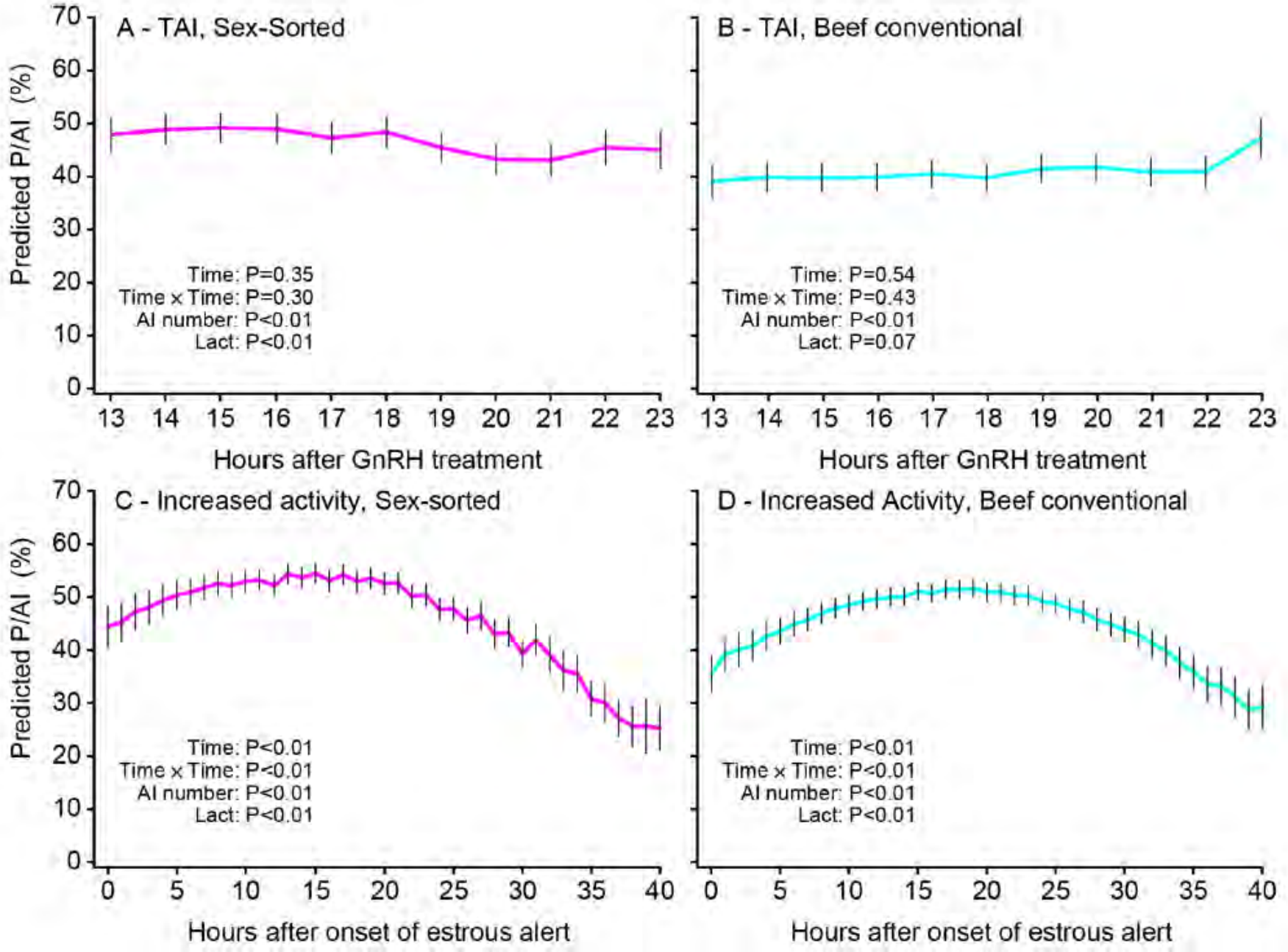

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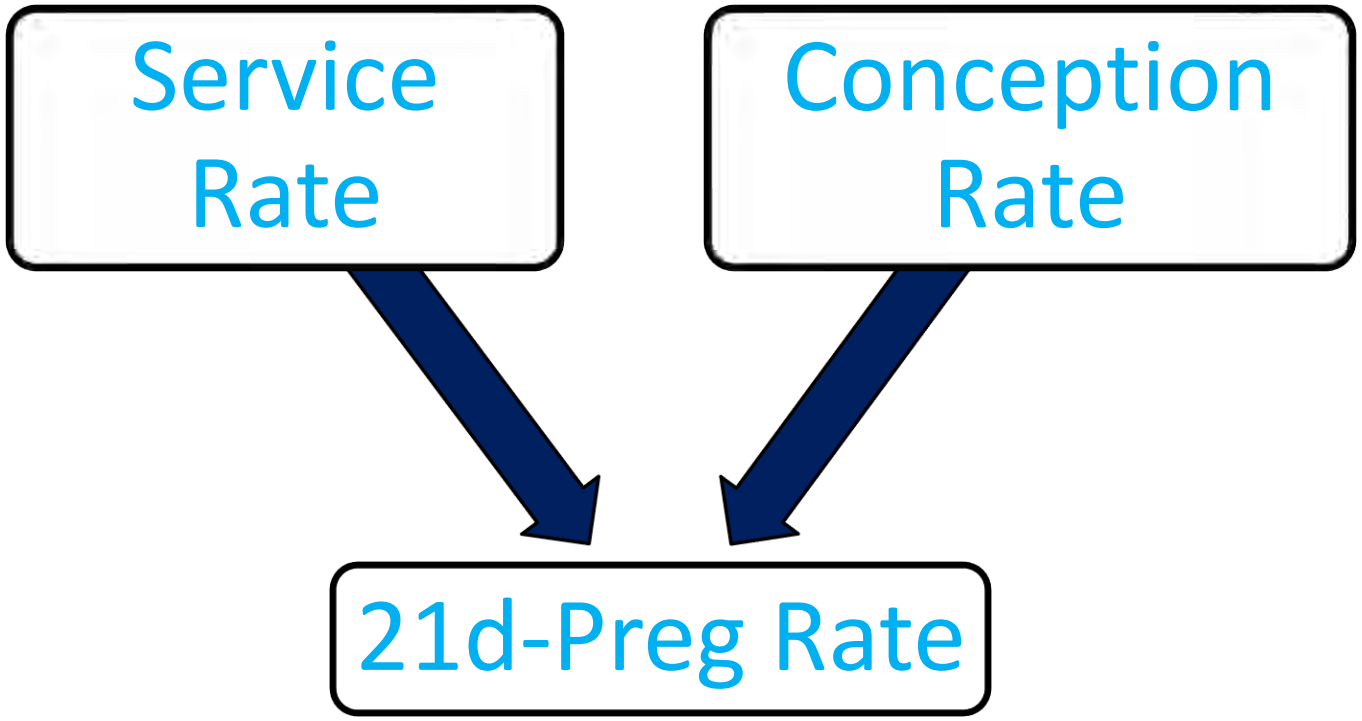
21-days Pregnancy Rate

- ✓ Proporzione di vacche elegibili che diventano gravide ogni 21 giorni
- ✓ Lunghezza ciclo estarle è di 21 giorni
- ✓ “vacca elegibile” = vuota, oltre il VWP e non parcheggiata



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21-days Pregnancy Rate

Data	Cal Disp	Cal	%	GravDis	Grav	%	Aborti
10/08/24	20	18	90	20	6	30	1
31/08/24	29	22	76	29	10	34	0
21/09/24	31	25	81	31	17	55	0
12/10/24	25	24	96	25	9	36	6
2/11/24	36	28	78	36	14	39	2
23/11/24	28	25	89	27	10	37	3
14/12/24	24	19	79	24	10	42	0
4/01/25	32	26	81	32	16	50	2
25/01/25	27	21	78	27	13	48	0
15/02/25	27	25	93	26	17	65	1
8/03/25	16	14	88	16	6	38	1
29/03/25	15	12	80	15	7	47	1
19/04/25	17	14	82	17	7	41	1
10/05/25	17	13	76	17	7	41	1
31/05/25	19	16	84	19	8	42	1
21/06/25	22	20	91	22	7	32	0
12/07/25	18	15	83	18	7	39	0
2/08/25	19	13	68	19	8	42	0
Tot	422	350	83	420	179	43	20

N° FA	95% LC	% Conc	#Grav	#Vuot	Abort	TotFe	%Tot
1	55-68	62	138	86	18	227	53
2	39-58	49	53	56	4	109	25
3	39-64	52	32	30	5	62	14
4	41-77	60	15	10	1	25	6
5	-	43	3	4	0	7	2
6	-	100	1	0	0	1	0
TOT	52-61	57	242	186	28	431	100

Periodo di attesa 76

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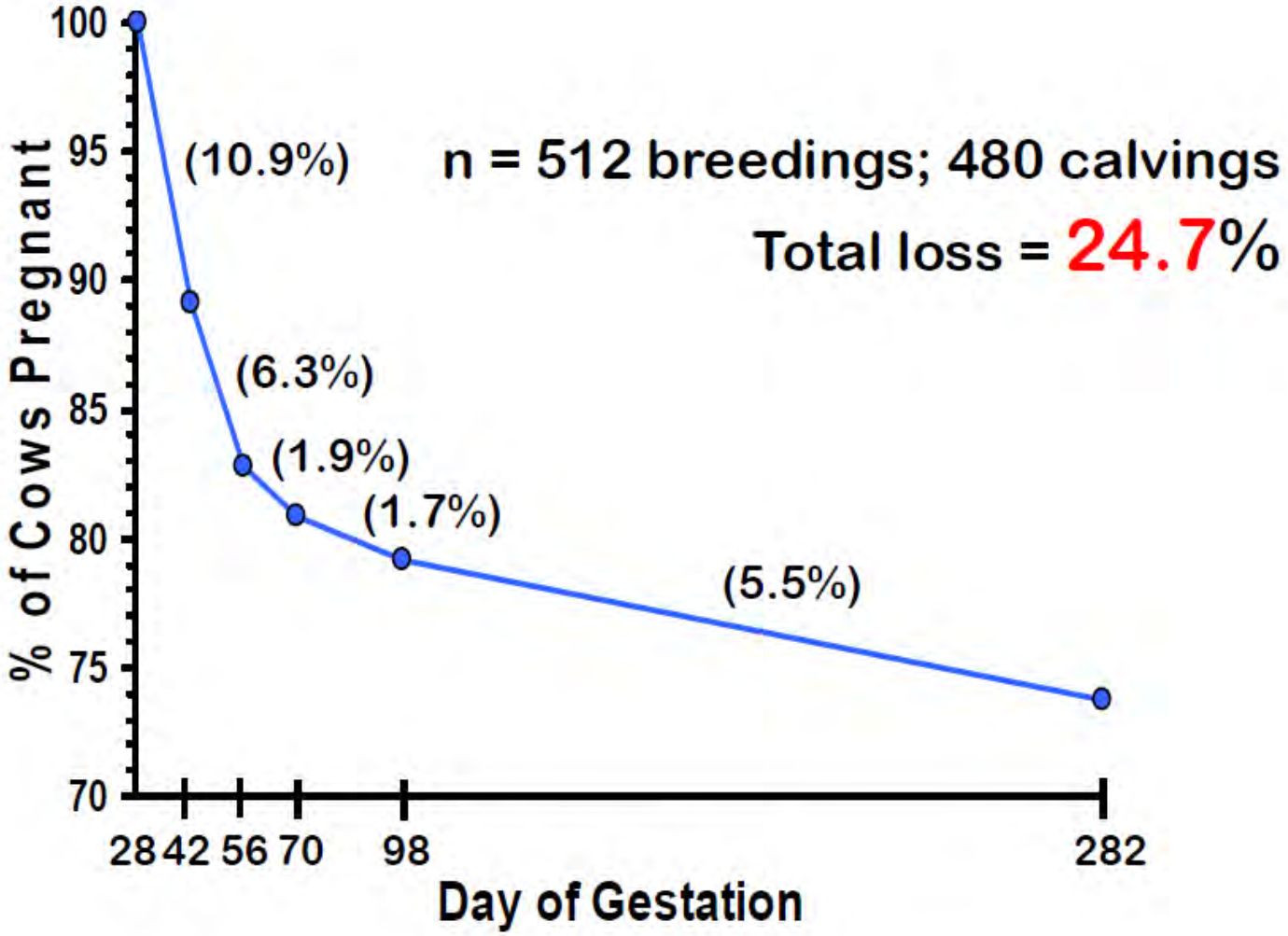
Perdita di gravidanza



Vasconcelos et al., 1997; Biol. Reprod. 56:141 abstr.

Review article

Pivotal periods for pregnancy loss during the first trimester of gestation in lactating dairy cows

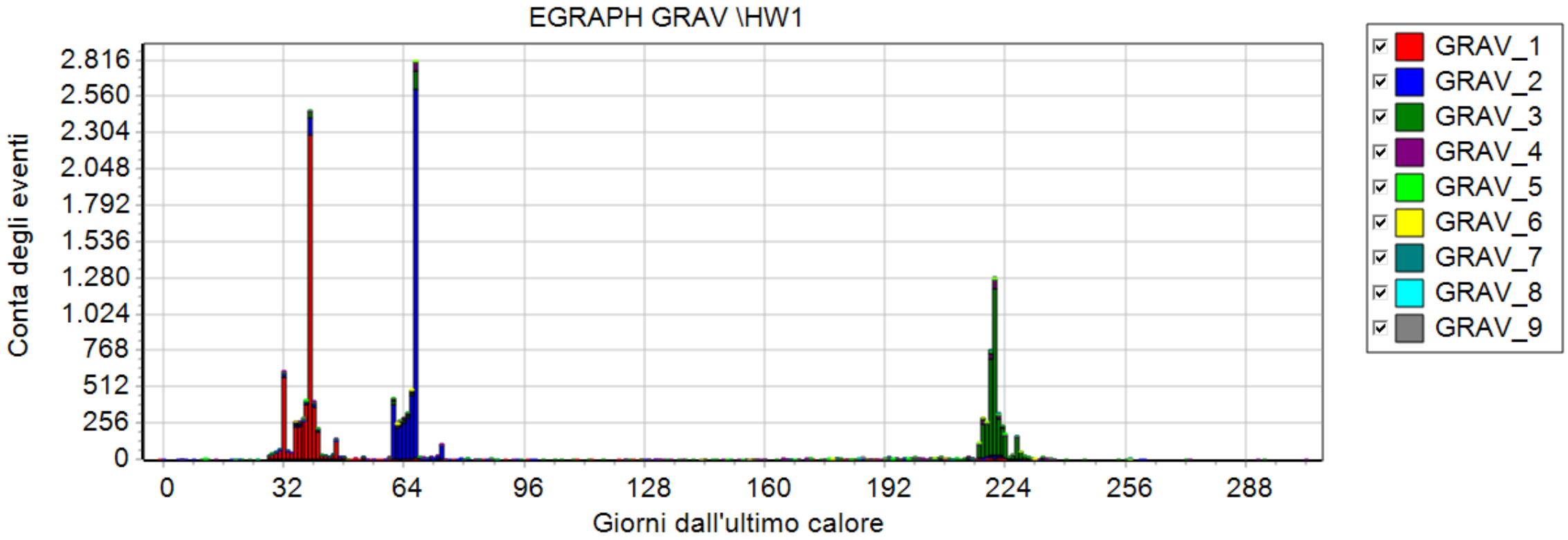
Milo C. Wiltbank [a,*], Giovanni M. Baez [a], Alvaro Garcia-Guerra [a], Mateus Z. Toledo [a], Pedro L.J. Monteiro [a,b], Leonardo F. Melo [a,b], Julian C. Ochoa [a], José E.P. Santos [c], Roberto Sartori [a,b]

[a] *Department of Dairy Science, University of Wisconsin–Madison, Madison, Wisconsin, USA*
[b] *Department of Animal Science, University of São Paulo, Piracicaba, SP, Brazil*
[c] *Department of Animal Sciences, University of Florida, Gainesville, Florida, USA*

Summary of pregnancy loss during first trimester in lactating dairy cattle. Some of the major causative factors that were discussed are listed and the factors that seem to be monitored for determination of loss or continuation of pregnancy through that period.

Item	Fertilization failure	Period 1—first week	Period 2 Day 8–28	Period 3 Second month	Period 4 Third month
Normal losses in each period	~10%—cool ~50%—hot	10–50%	~20%	5–20%	~2%
Causes of losses	-Heat stress -High P4 near AI -Uterine PMN -Semen and AI	-Oocyte problems -P4 before AI -Postpartum metabolic issues -Heat stress	-Ill-timed elongation -Low P4 after AI -Histotroph deficiencies	-Inopportune placentome formation -Vascular development problems	-Unilateral twins
What is being monitored?	Environmental, hormonal, semen, and uterine condition	Gamete quality	Trophoblast quality	Embryo and placentome quality	Crowding in uterine horn

Diagnosi di non gravidanza



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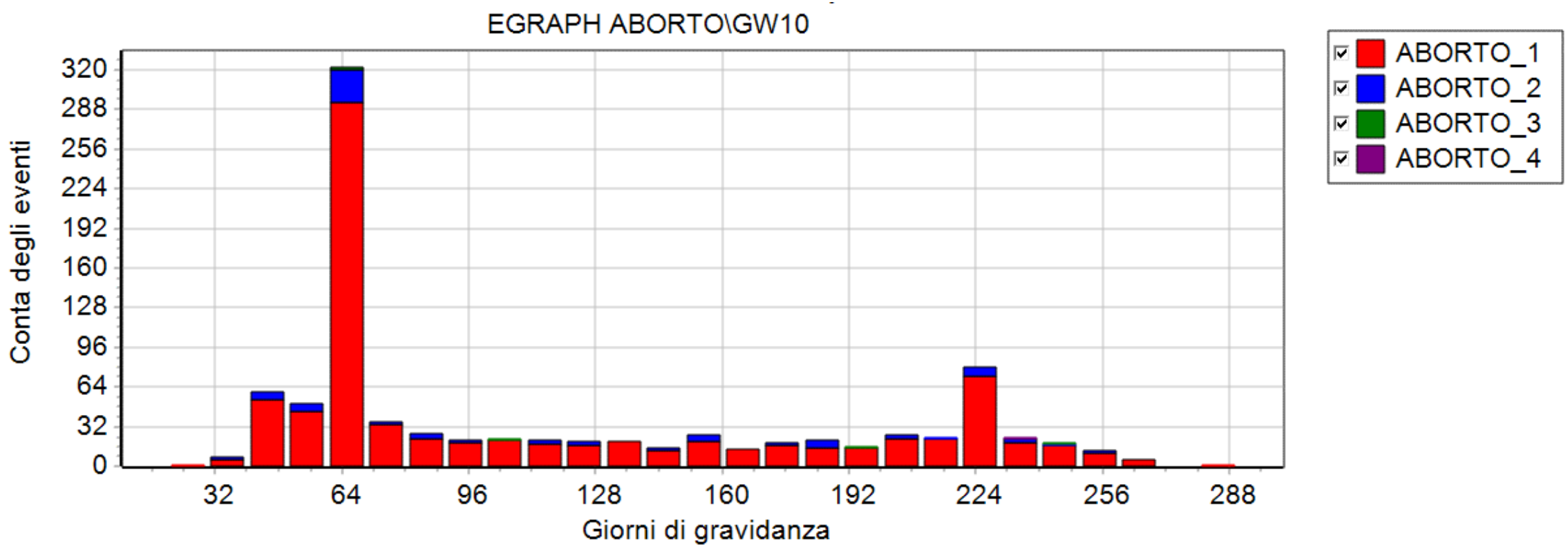
Distribuzione aborti



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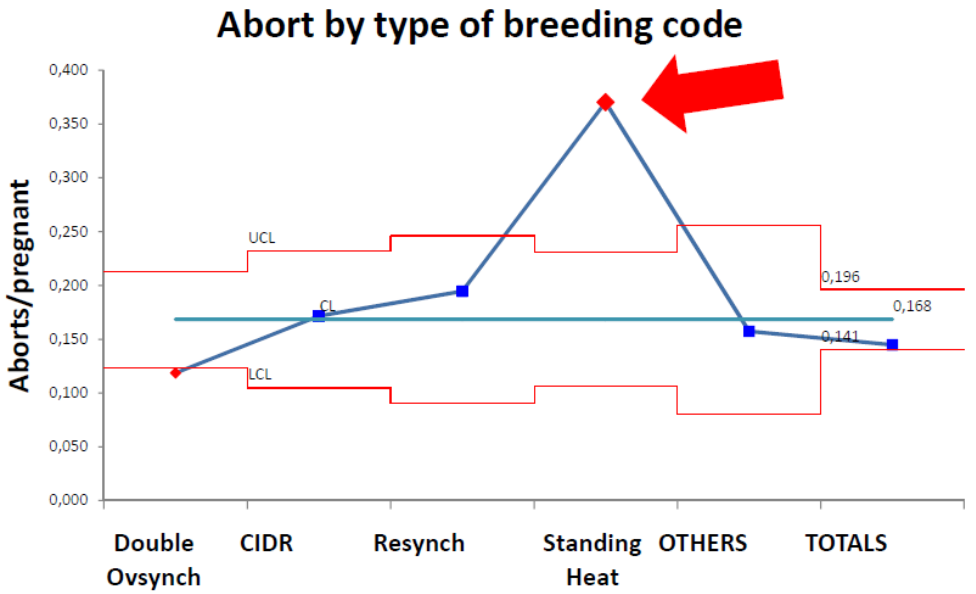
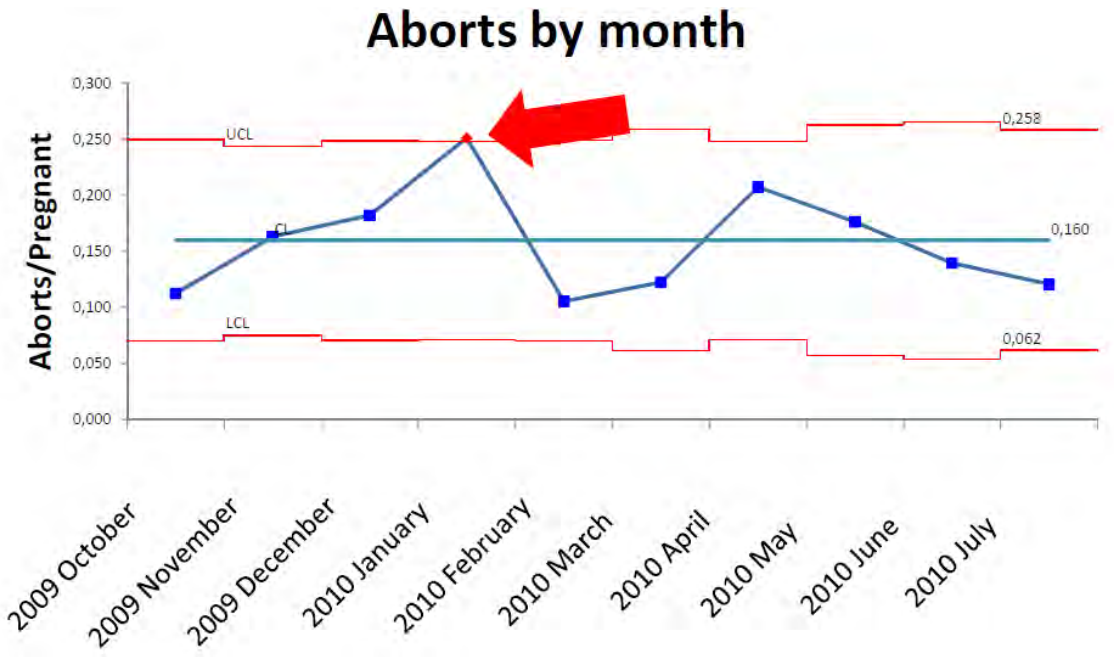
GRLAT	%	Conta	Tot	95% LC
1	10	294	2892	9-11
2	10	265	2755	9-11
3	8	181	2205	7- 9
Tot	9	740	7852	9-10





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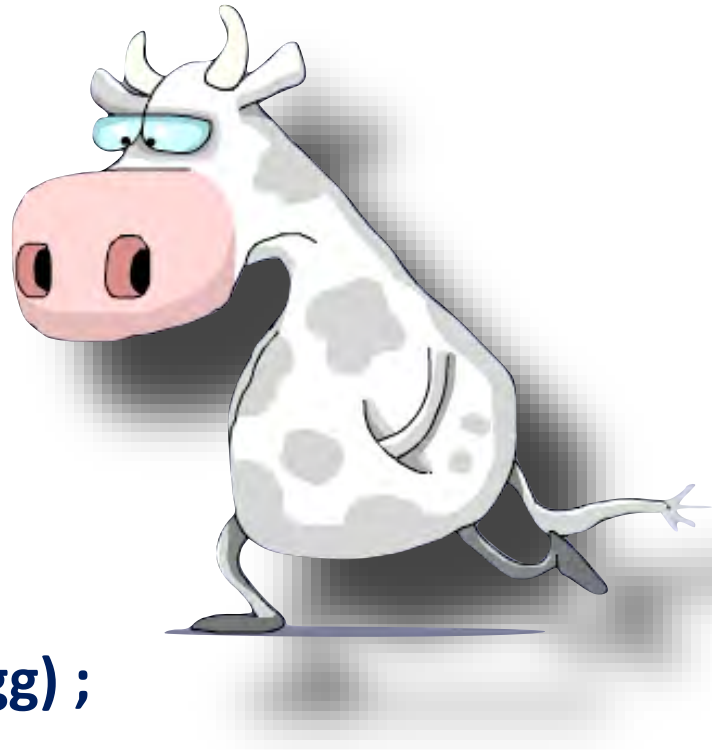
Conclusioni

1. **La fertilità si costruisce nel periodo di transizione:**
   - ✓Lunghezza di asciutta (almeno 50 gg)
   - ✓Apporti calorici e proteici della razione di asciutta
   - ✓Gestione della movimentazione degli animali
   - ✓Monitoraggio patologie post-partum
2. **Avere una buona strategia per la 1° FA:**
   - ✓Nessuna vacca non fecondata sopra i 100 gg in latte
   - ✓Tasso di concepimento 1° FA > 45%
3. **Effettuare una corretta diagnosi di non-gravidanza (32gg) ;**
4. **Avere una strategia per il resynch:**
   - ✓Intervallo breve tra le FA < 42 gg
   - ✓Tasso di concepimento > 35%
5. **Monitorare il tasso di perdita di gravidanza**



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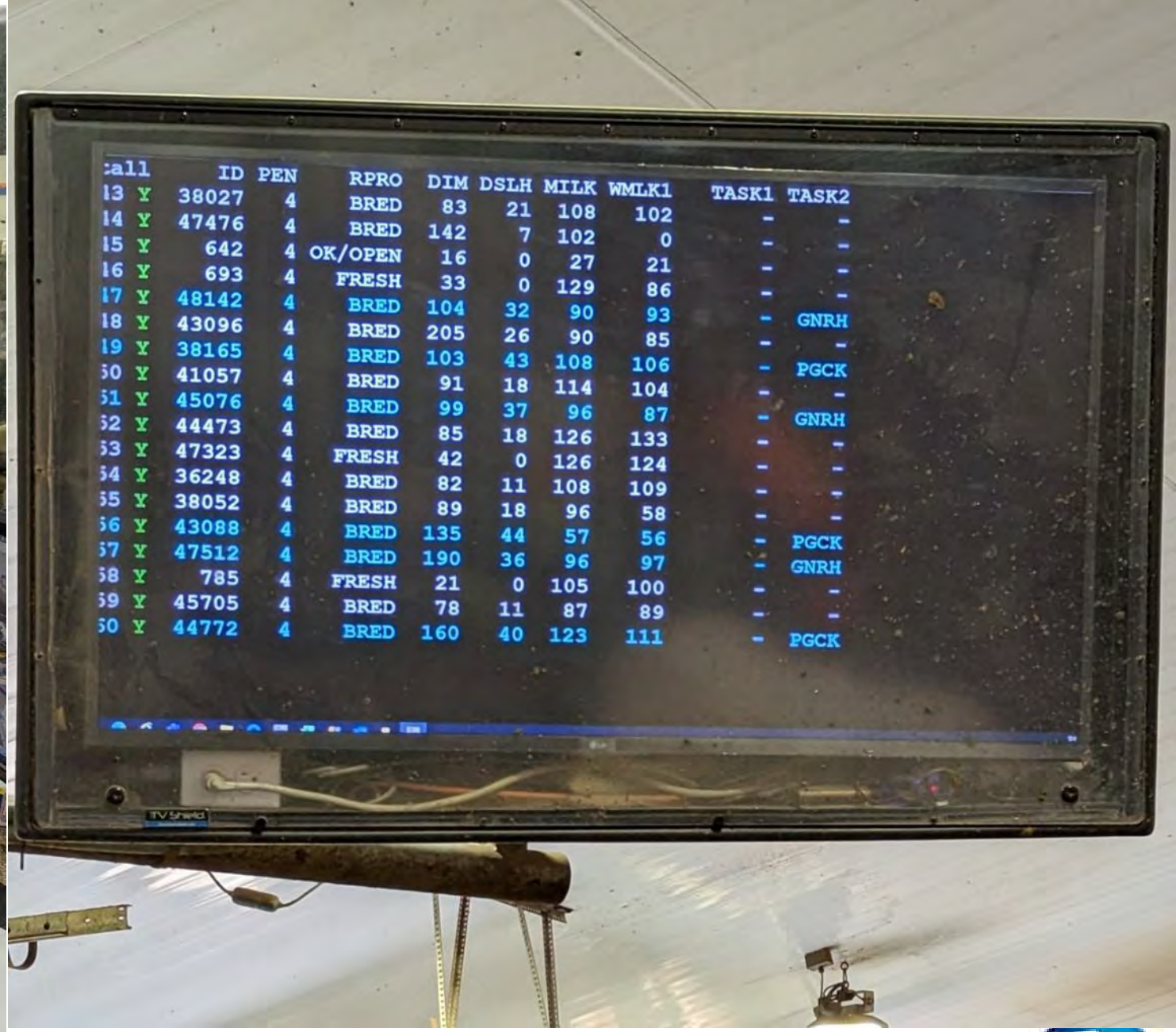

Call		ID	PEN	RPRO	DIM	DSLH	MILK	WMLK1	TASK1	TASK2
13	Y	38027	4	BRED	83	21	108	102	-	-
14	Y	47476	4	BRED	142	7	102	0	-	-
15	Y	642	4	OK/OPEN	16	0	27	21	-	-
16	Y	693	4	FRESH	33	0	129	86	-	-
17	Y	48142	4	BRED	104	32	90	93	-	GNRH
18	Y	43096	4	BRED	205	26	90	85	-	-
19	Y	38165	4	BRED	103	43	108	106	-	PGCK
50	Y	41057	4	BRED	91	18	114	104	-	-
51	Y	45076	4	BRED	99	37	96	87	-	GNRH
52	Y	44473	4	BRED	85	18	126	133	-	-
53	Y	47323	4	FRESH	42	0	126	124	-	-
54	Y	36248	4	BRED	82	11	108	109	-	-
55	Y	38052	4	BRED	89	18	96	58	-	-
56	Y	43088	4	BRED	135	44	57	56	-	PGCK
57	Y	47512	4	BRED	190	36	96	97	-	GNRH
58	Y	785	4	FRESH	21	0	105	100	-	-
59	Y	45705	4	BRED	78	11	87	89	-	-
60	Y	44772	4	BRED	160	40	123	111	-	PGCK

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