Impacto de fatores ambientais e metabólitos na fertilidade de vacas de leite

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Rebanho bovino brasileiro

Classificação mundial ?

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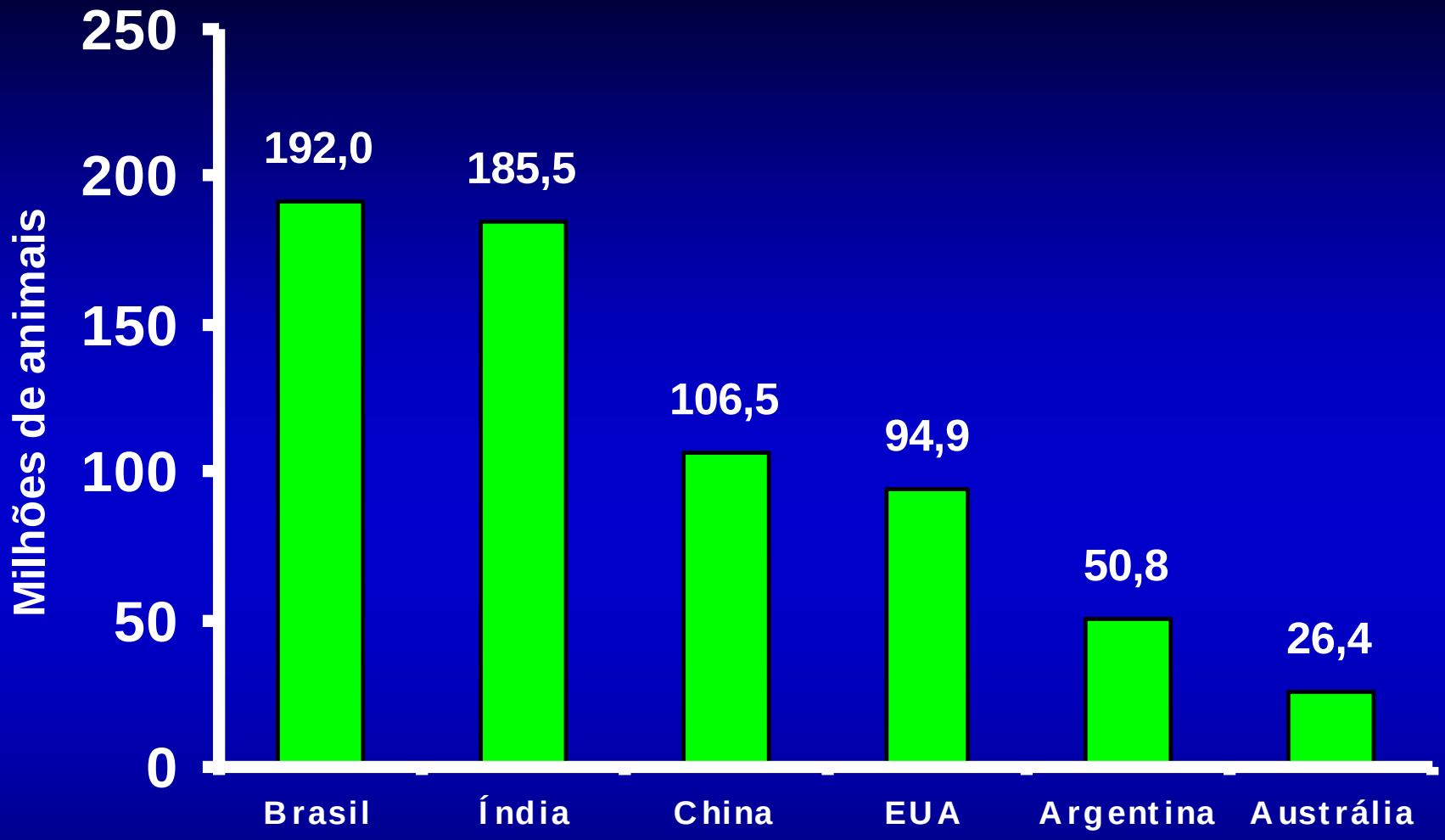

Tabela. Principais rebanhos de bovinos (2005)

Source: FAO 2005 (http://faostat.fao.org/faostat)

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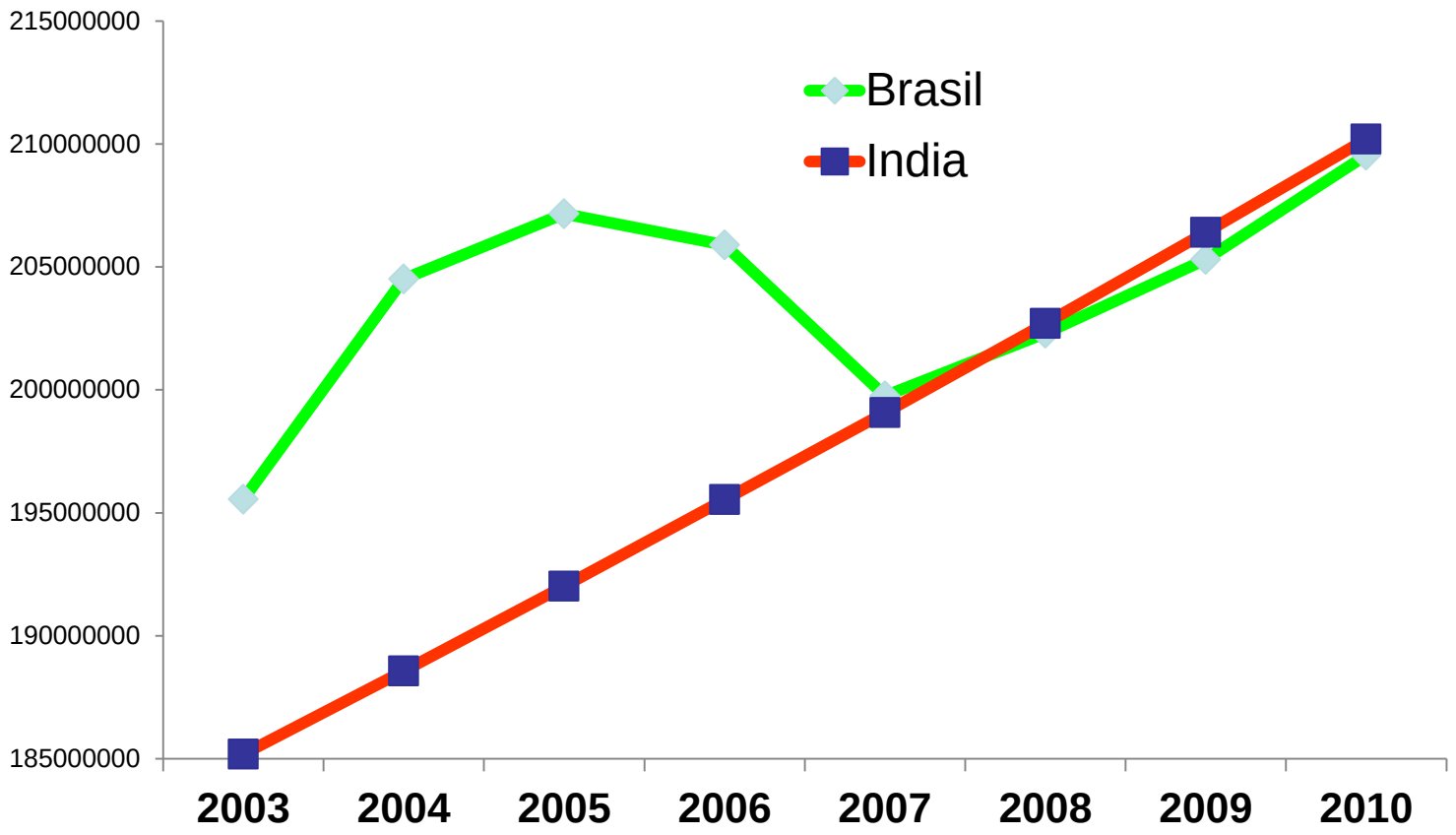

Figura - Número de bovinos no Brasil e na Índia

Source: FAO 2012 (http://faostat.fao.org/faostat)

Produção de leite

Classificação mundial ?

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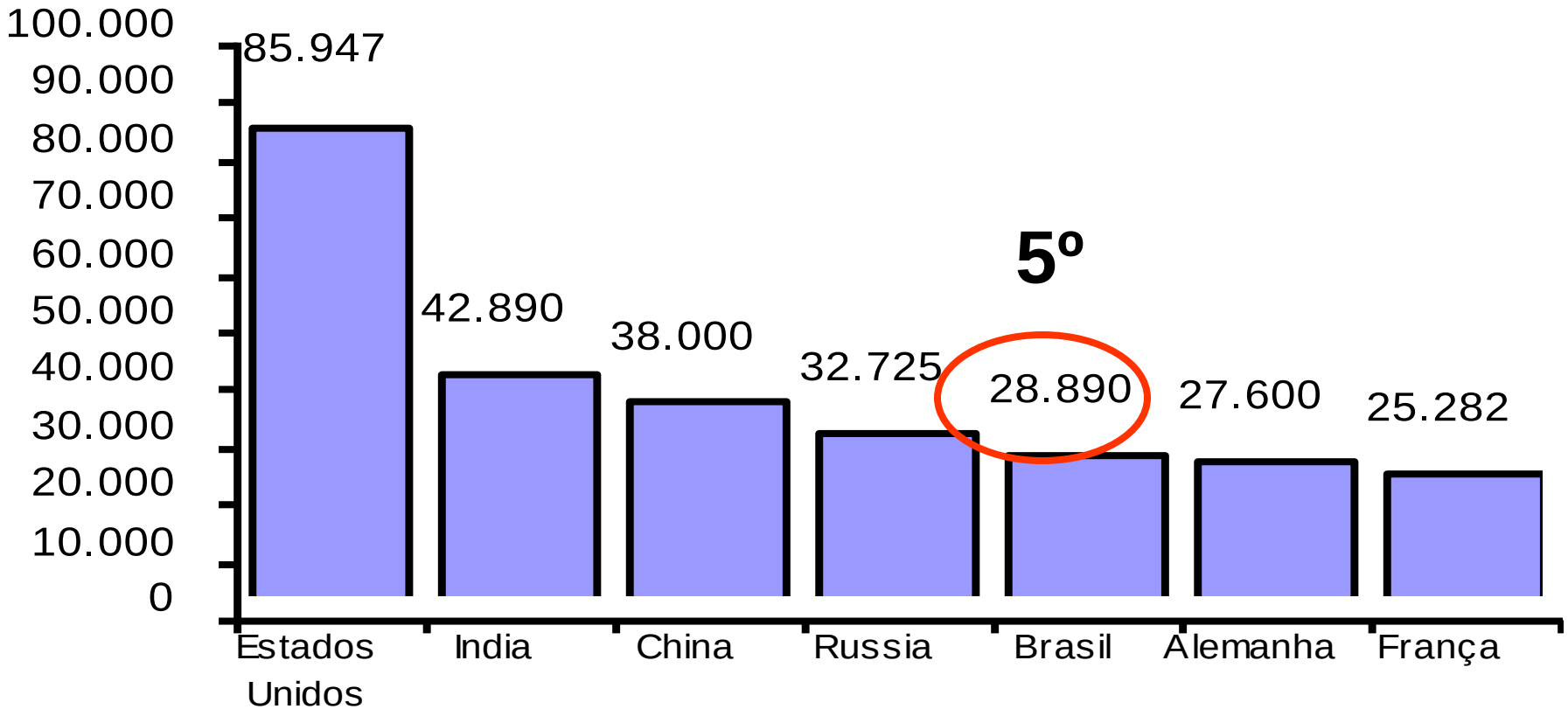
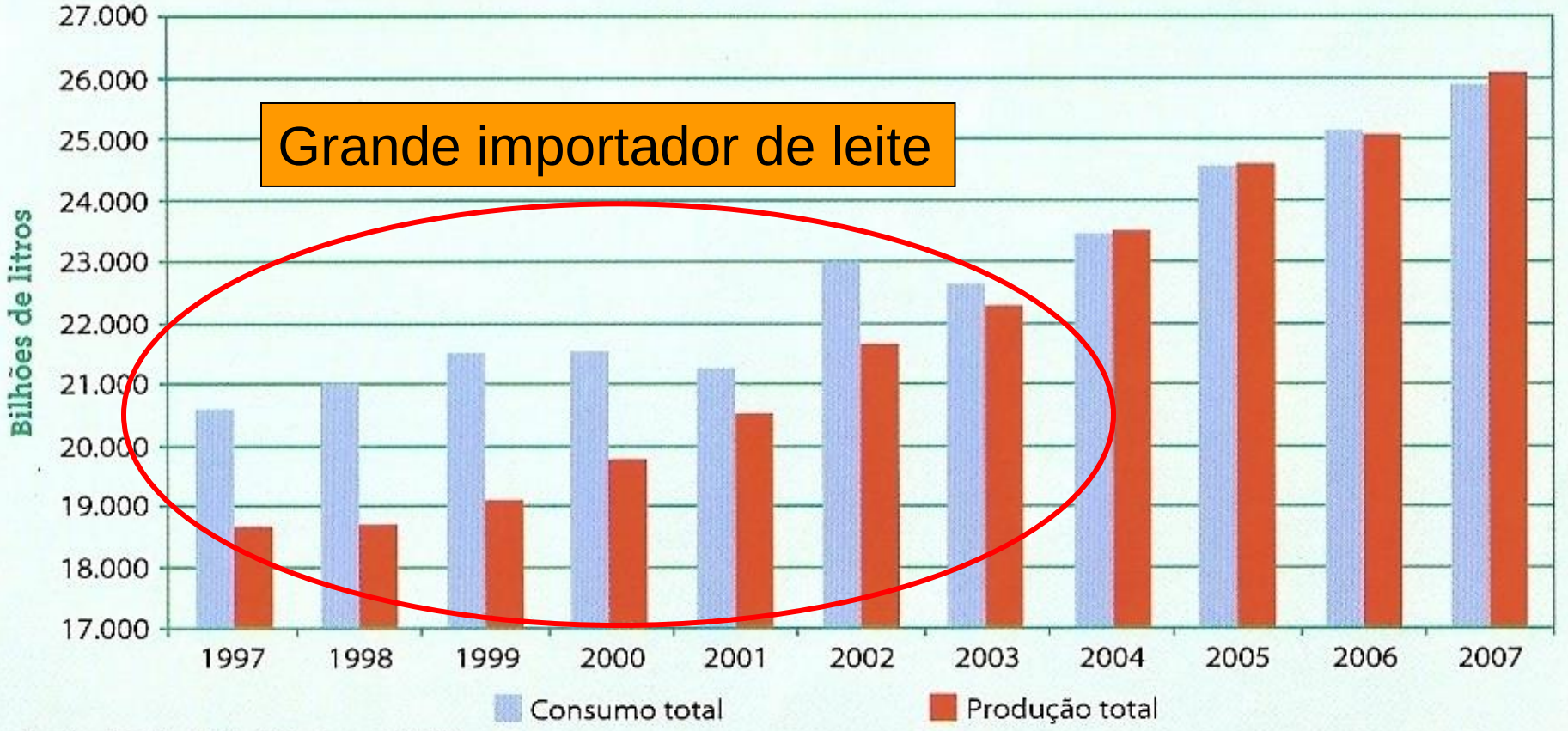
Principais Países produtores de Leite do Mundo - 2008

em milhões de litros



Roberto Jank, 2008

Gráfico 2
Evolução do consumo total e da produção total de 1997 a 2007



Fonte: IBGE, MAA, MF, Secex/MDIC
Elaboração: CEPEA

Disponibilidade interna de leite em 2007 = 139,3 litros por habitante/ano

Mercado interno segundo recomendação do Ministério da Saúde (223 litros/hab/ano)

40,9 Bilhões de litros de leite/ano (+ 15 Bilhões litros/ano)

Saldo da balança comercial de lácteos (em US$ 1.000)

Fonte: Mapa, adaptação ***DBO***.

Produtividade por vaca (tonelada por cabeça/ano)

	2010
Estados Unidos	9,6
Japão	9,4
Canadá	8,5
Austrália	5,8
União Européia – 27	5,7
Argentina	5,1
Ucrânia	4,0
China	4,0
Nova Zelândia	3,6
Rússia	3,5
México	1,7
Brasil	1,7
Índia	1,2

4,6 litros/dia

Fonte: USDA *(United States Department of Agriculture) - Dairy: World Markets and Trad/ December 2010*

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Eficiência reprodutiva do rebanho bovino brasileiro

Vacas de leite

~23 milhões

X

Vacas de corte

~50 milhões

~ 73 milhões

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Eficiência reprodutiva do rebanho brasileiro

N° Matrizes[1]	72.448.426
N° Bezerros Desmamados[2]	47.163.760
N° Bezerros Nascidos[3]	50.936.861
Taxa de Desmama[4] (%)	65,1
Taxa de Nascimento[5] (%)	70,3
IEP[6]	16,9

[1]Número de fêmeas em idade reprodutiva (vacas e novlhas > 2anos); [2]Número de bezerros desmamados; [3]Estimativa do número de bezerros nascidos (considerando 8% de mortalidade); [4]Taxa de desmame = N° Bez. Desm./N° Matrizes; [5]Estimativa da taxa de nascimento = N° Bez. Nasc./N° Matrizes; [6]Intervalo entre partos.

Estimativas empregando informações do Anulpec 2010

Intervalo entre o parto e a concepção

Período de serviço = 225 dias (7,4 meses)
Intervalo entre partos = 515 dias (17 meses)

Parto

225 dias

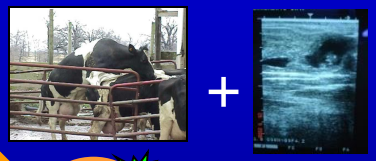
Gestação de 280/290 dias

Parto

225 dias

515 dias

Período de serviço = 75 dias (2,5 meses)
Intervalo entre partos = 365 dias (12 meses)



Parto

75/85 dias

Parto

Gestação de 280/290 dias

75 dias

365 dias

Reduzir:

- 150 dias PS
- 5 meses IEP

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Diversos sistemas de produção de leite

Grupo genético: Holandesa, mestiça ou zebuína

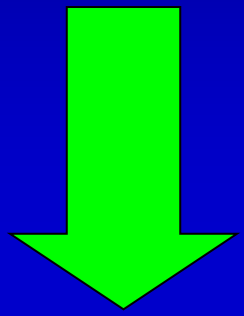
Alimentação: Pasto (qualidade) / confinamento

Época de produção: Verão ou inverno

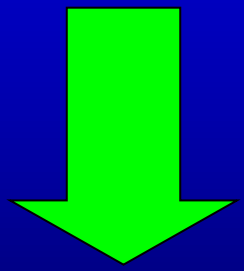
Grande variação conforme os sistemas de produção

1. Aumentar a taxa de serviço

2. Aumentar a taxa de concepção



3, Aumentar a taxa de prenhez

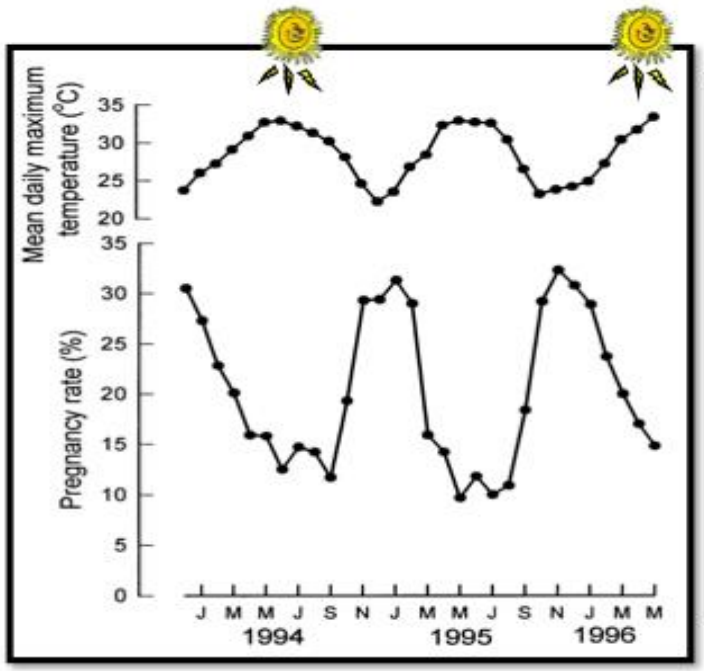


Diminuir o período parto / concepção e o intervalo entre partos

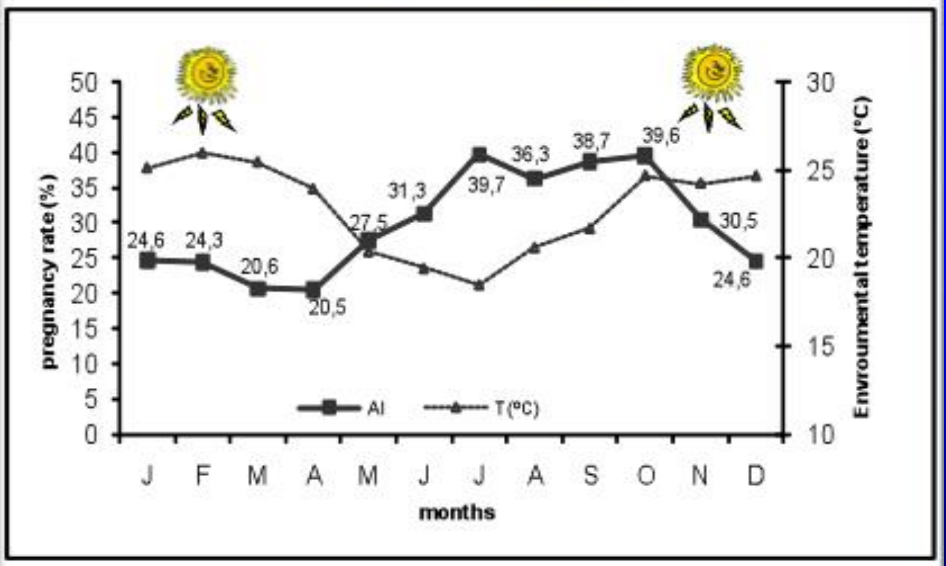
Fatores ambientais que interferem na fertilidade de vacas de leite

Efeito do estresse calórico na fertilidade de rebanhos de leite

Fertility!



Hansen & Arechiga, 1999



Rodrigues et al. 2007

Effect of maternal heat-stress on follicular growth and oocyte competence in *Bos indicus* cattle

J.R. de S. Torres-Júnior [a,*], M. de F.A. Pires [b], W.F. de Sá [b], A. de M. Ferreira [b], J.H.M. Viana [b], L.S.A. Camargo [b], A.A. Ramos [b], I.M. Folhadella [b], J. Polisseni [b], C. de Freitas [b], C.A.A. Clemente [b], M.F. de Sá Filho [a], F.F. Paula-Lopes [a], P.S. Baruselli [a,*]

[a] *Department of Animal Reproduction, FMVZ-USP, Rua Prof. Dr. Orlando Marques de Paiva 87, CEP 05508-000, São Paulo, SP, Brazil*

[b] *Dairy Cattle Research Center, EMBRAPA, R. Eugênio do Nascimento 610, Juiz de Fora, MG 36038-330, Brazil*

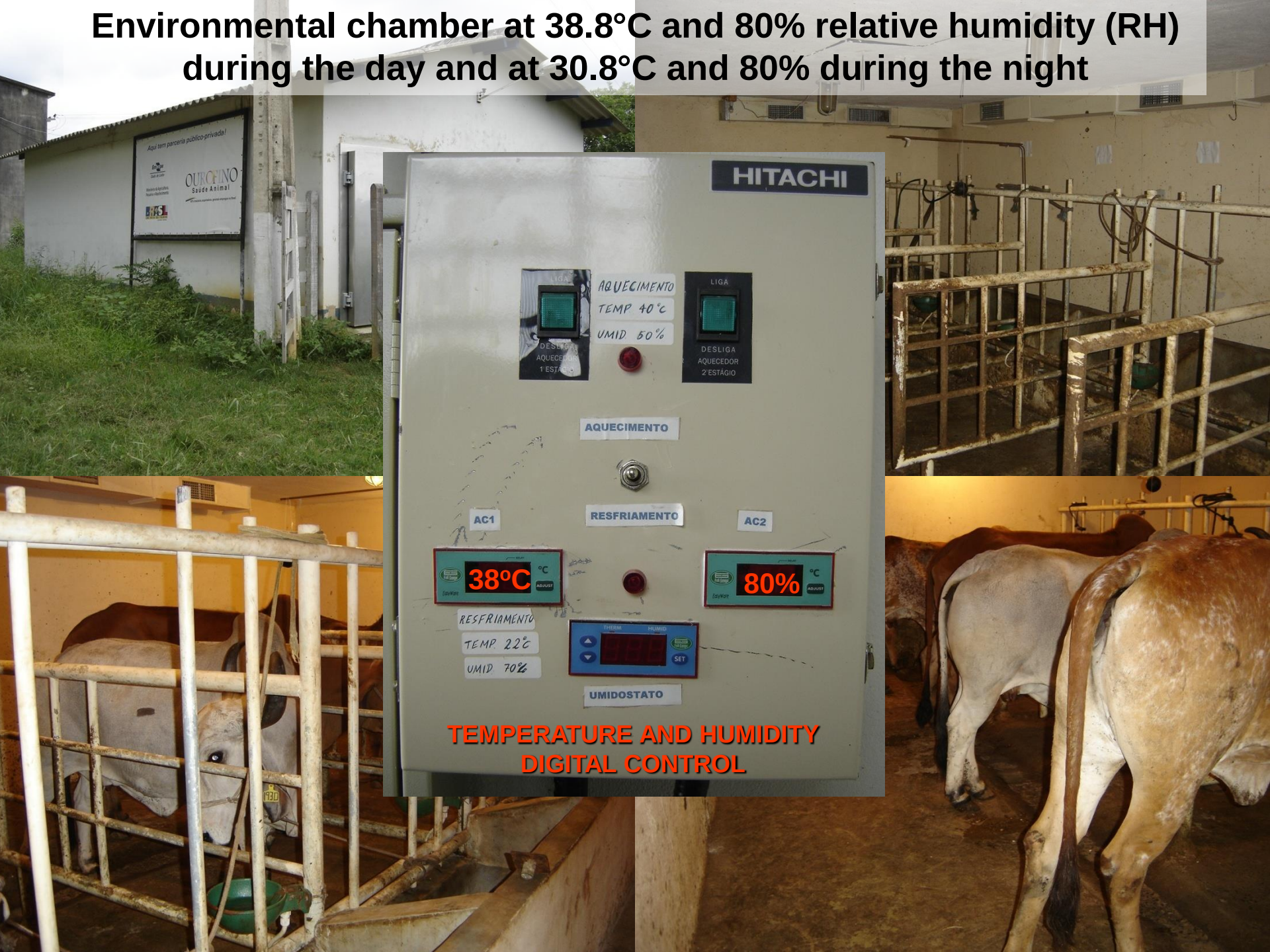
Received 4 May 2007; accepted 13 June 2007

University of São Paulo and Embrapa

- 10 multiparous non-lactating Gir cows
- Adaptation (stall and diet) = 14 days

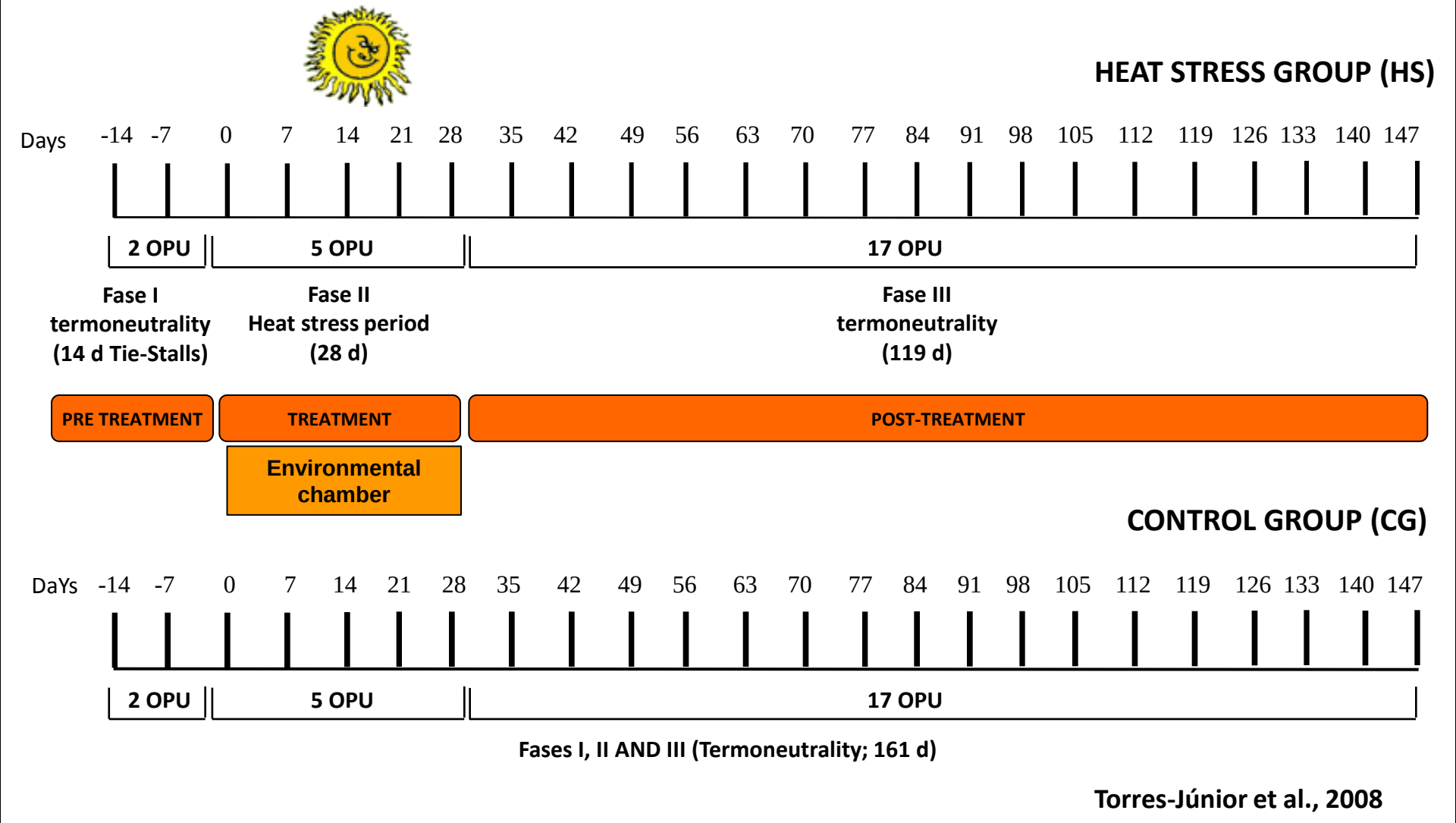
Torres-Júnior et al., 2008 (Theriogenology, v. 69, p. 155-166)

Environmental chamber at 38.8°C and 80% relative humidity (RH) during the day and at 30.8°C and 80% during the night



Heat Stress in *B. indicus cows*

Experimental design



Fases I, II AND III (Termoneutrality; 161 d)

Torres-Júnior et al., 2008

Heat Stress in *B. indicus cows*

Codominance

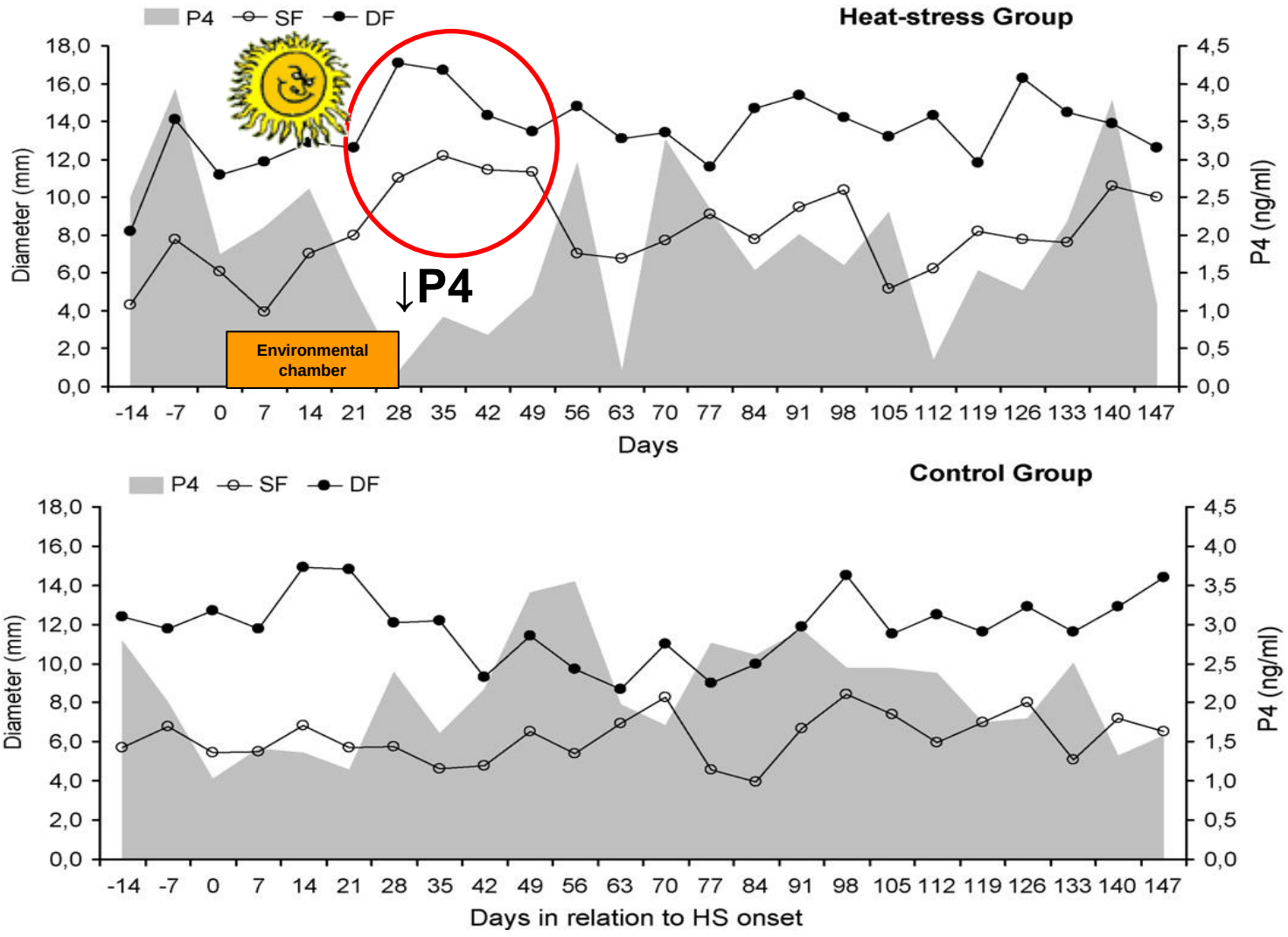


Fig. Codominance as a result of Gir cows to exposure to heat stress

Torres-Júnior et al., 2008

Heat Stress in *B. indicus cows*

Blastocyst Rate

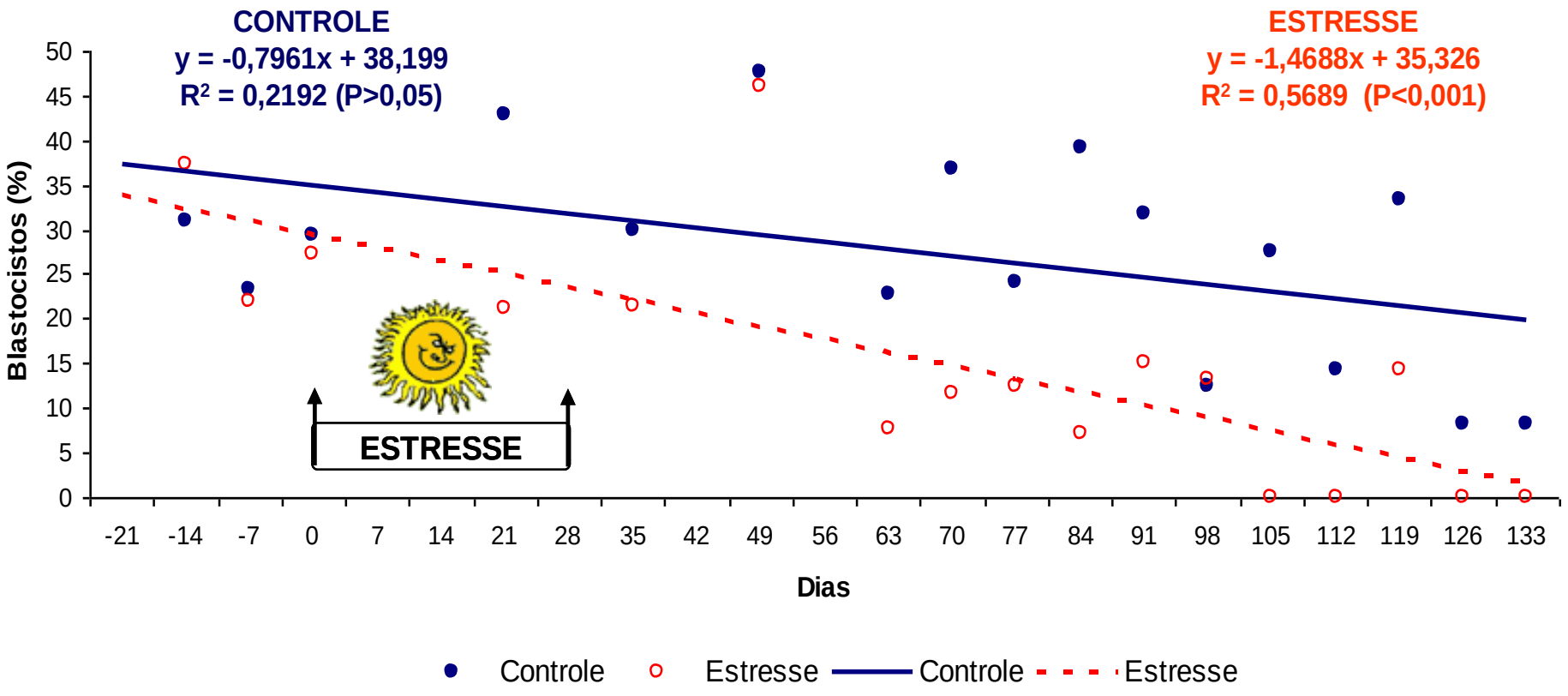


Fig. Blastocyst rate (in vitro) in control and heat stressed Gir cows

Torres-Júnior et al., 2008

Conclusão

O estresse calórico interfere na qualidade do oócito e na produção in vitro de embriões

Existe diferença de categoria na qualidade do oócito e na fertilidade?

Vacas vs Novilhas
Efeito do estresse calórico na taxa de concepção

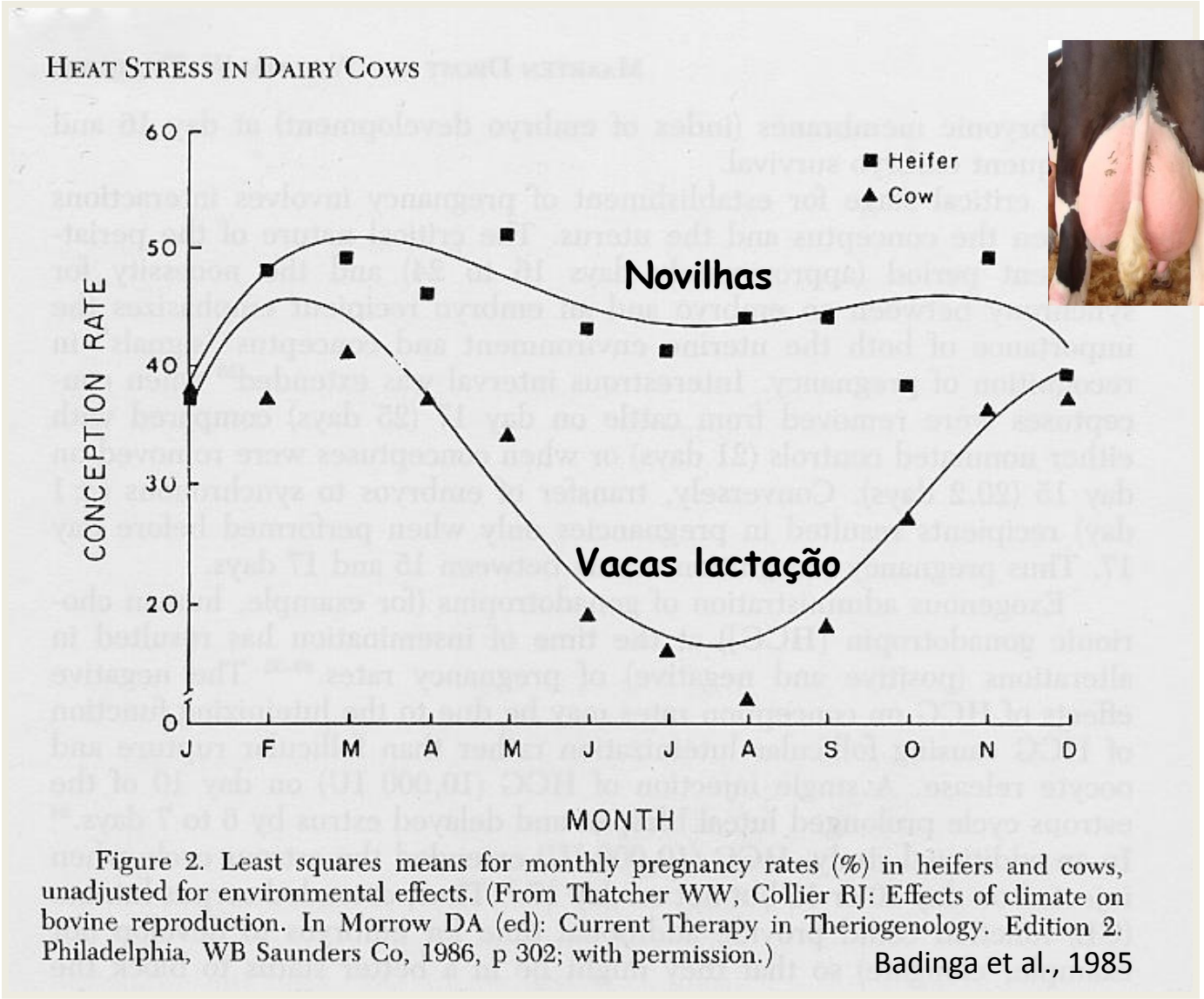
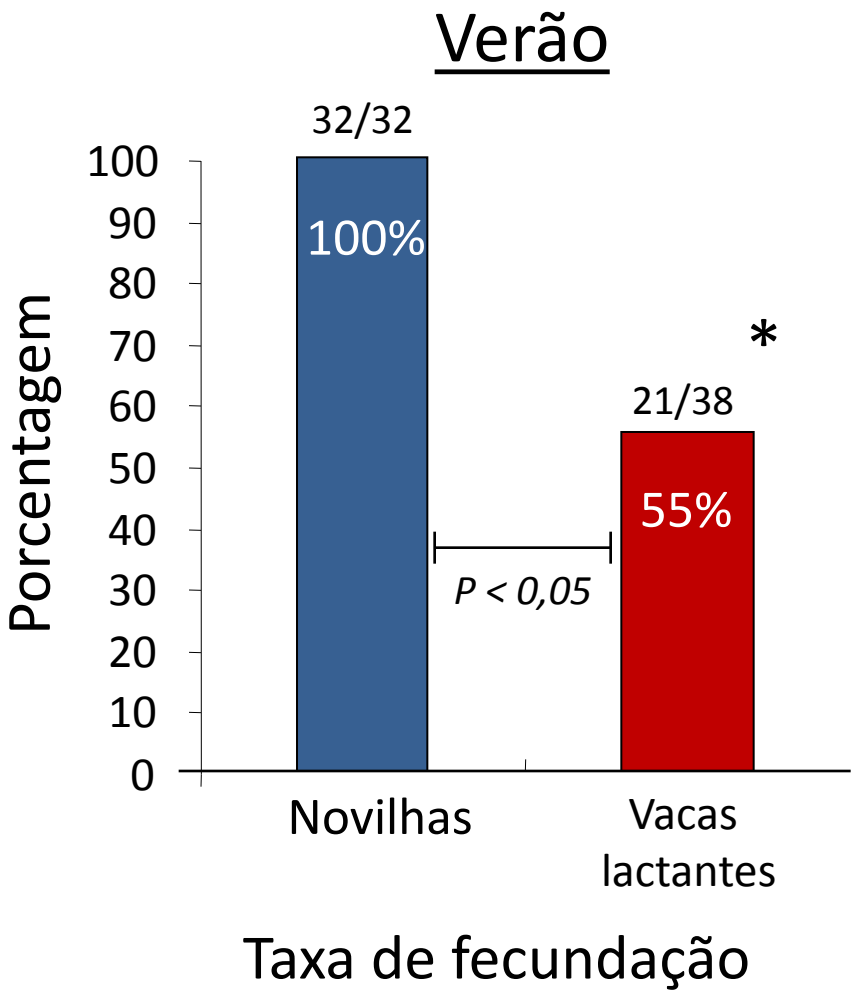


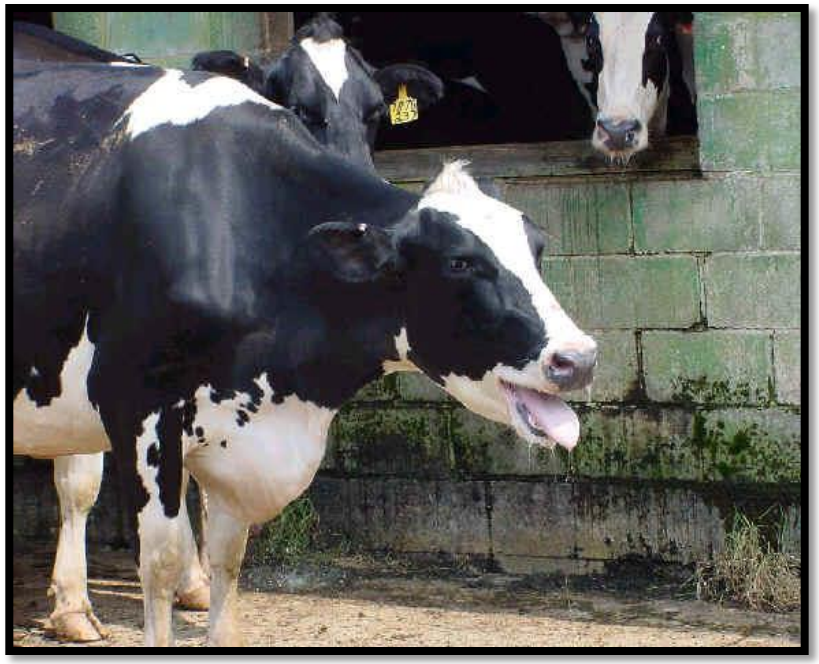
Figure 2. Least squares means for monthly pregnancy rates (%) in heifers and cows, unadjusted for environmental effects. (From Thatcher WW, Collier RJ: Effects of climate on bovine reproduction. In Morrow DA (ed): Current Therapy in Theriogenology. Edition 2. Philadelphia, WB Saunders Co, 1986, p 302; with permission.)

Badinga et al., 1985

Vacas vs Novilhas
Taxa de fecundação durante o estresse calórico



Taxa de fecundação



* 80% das estruturas não clivadas possuem espermatozóde accesório na zona pelúcida

(Sartori et al., 2002)

Fatores que afetam a produção de embriões em doadoras da raça holandesa

TESE MESTRADO

LAIS M. VIEIRA, FMVZ-USP 2013

Mv. Carlos Rodrigues, Clinica SAMVET

EFEITO CATEGORIA

1.562 protocolos de superovulação

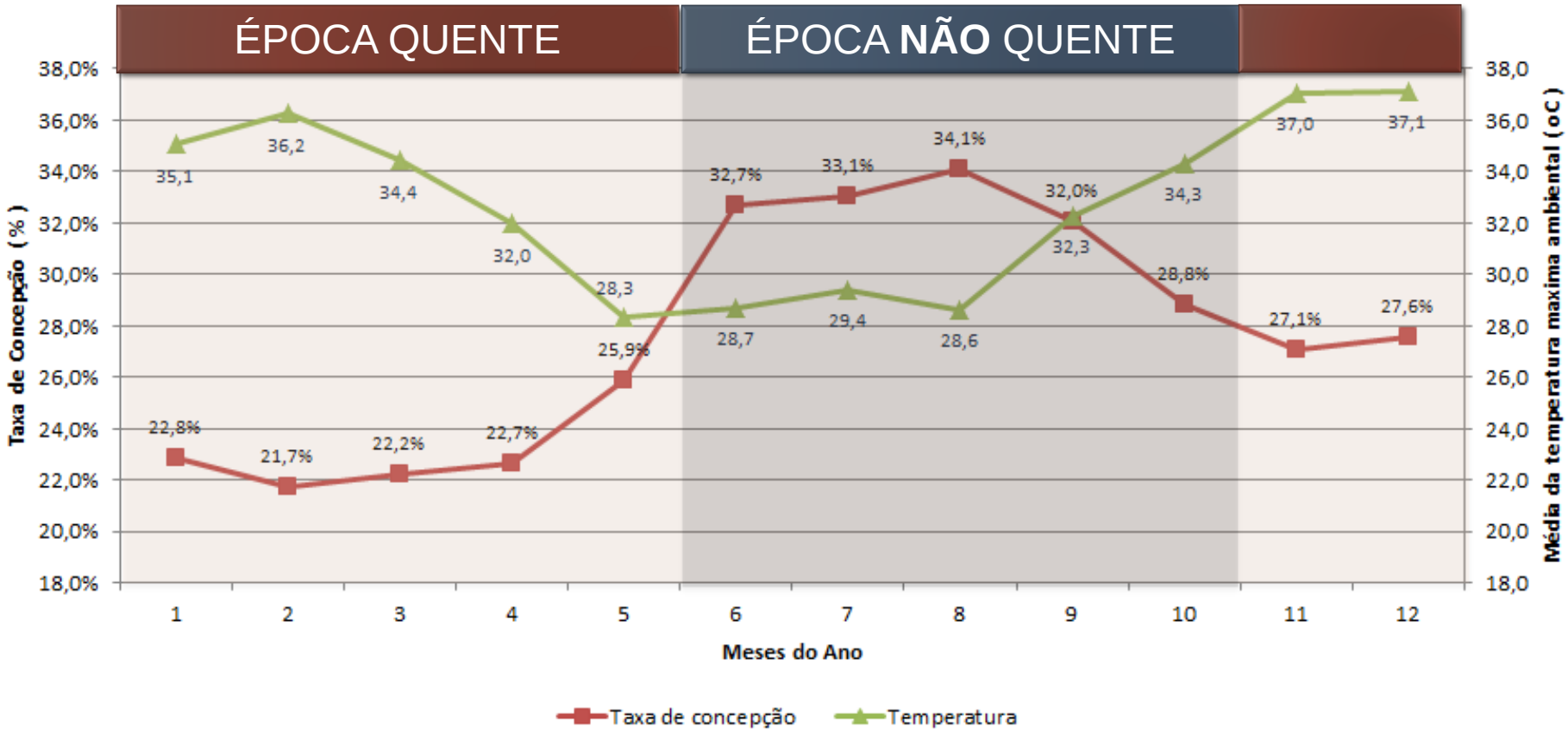
NOVILHA (n = 953)

VACA LACTANTE (n = 609)

Vieira, 2013

VARIÁVEIS CLIMÁTICAS

ÉPOCA DO ANO



Taxa de concepção de vacas Holandesas em lactação submetidas a IA (n = 39.393) de acordo com os meses do ano. Os meses do ano foram agrupados em época quente (novembro e dezembro e janeiro a maio) e época não quente (junho a outubro). Dados referentes aos anos de janeiro de 2006 a março de 2012 da Fazenda Santa Rita.

Vieira, 2013

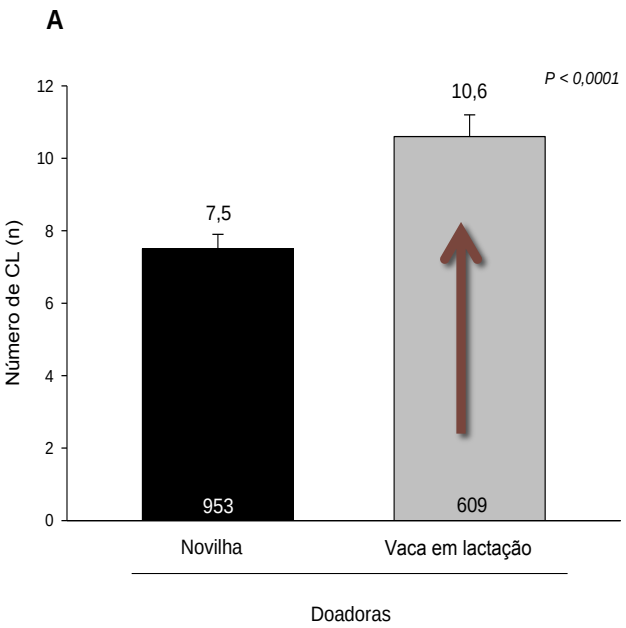
DADOS GERAIS
- 1.562 SOV -

TAXA DE SUPEROVULAÇÃO (2 ou mais CL)	88,7%
TOTAL DE CL	9,3 ± 0,2
TOTAL DE ESTRUTURAS RECUPERADAS	7,1 ± 0,2
TAXA DE RECUPERAÇÃO	68,6%
ESTRUTURAS FERTILIZADAS	4,6 ± 0,1 (64,4%)
EMBRIÕES VIÁVEIS	3,8 ± 0,1 (54,1%)
EMBRIÕES DEGENERADOS	0,7 ± 0,04 (10,3%)

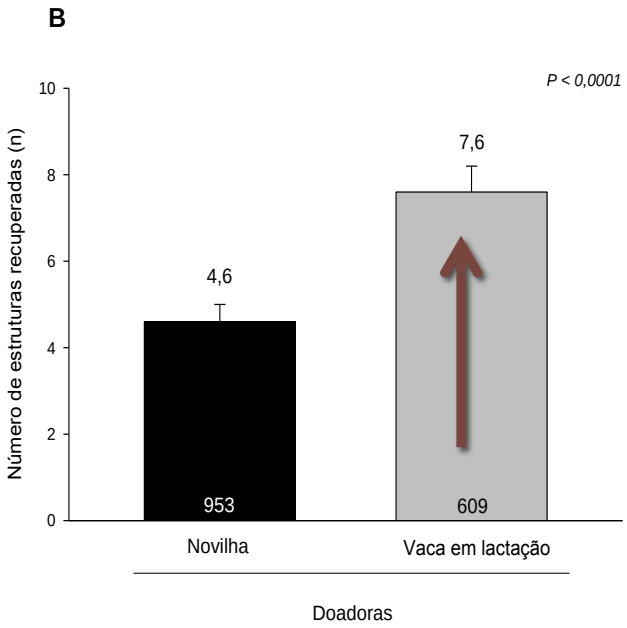
Vieira, 2013

RESPOSTA SUPEROVULATÓRIA
- Categoria animal -

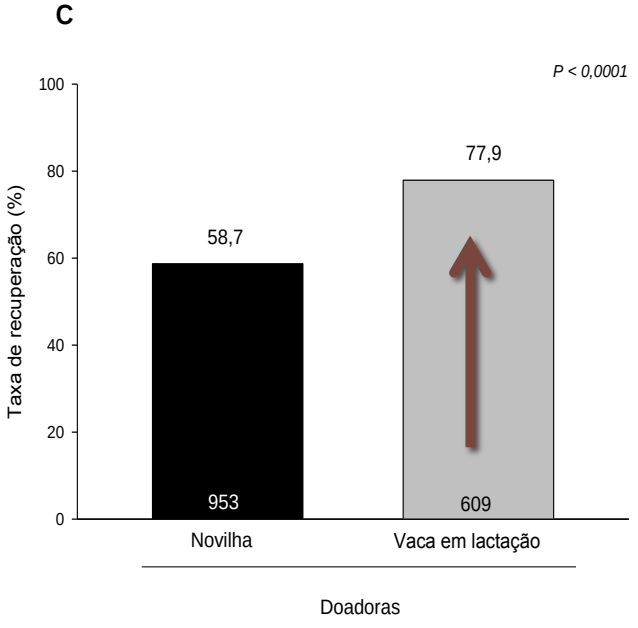
Número de CL (n)



Número de estruturas recuperadas (n)



Taxa de recuperação (%)



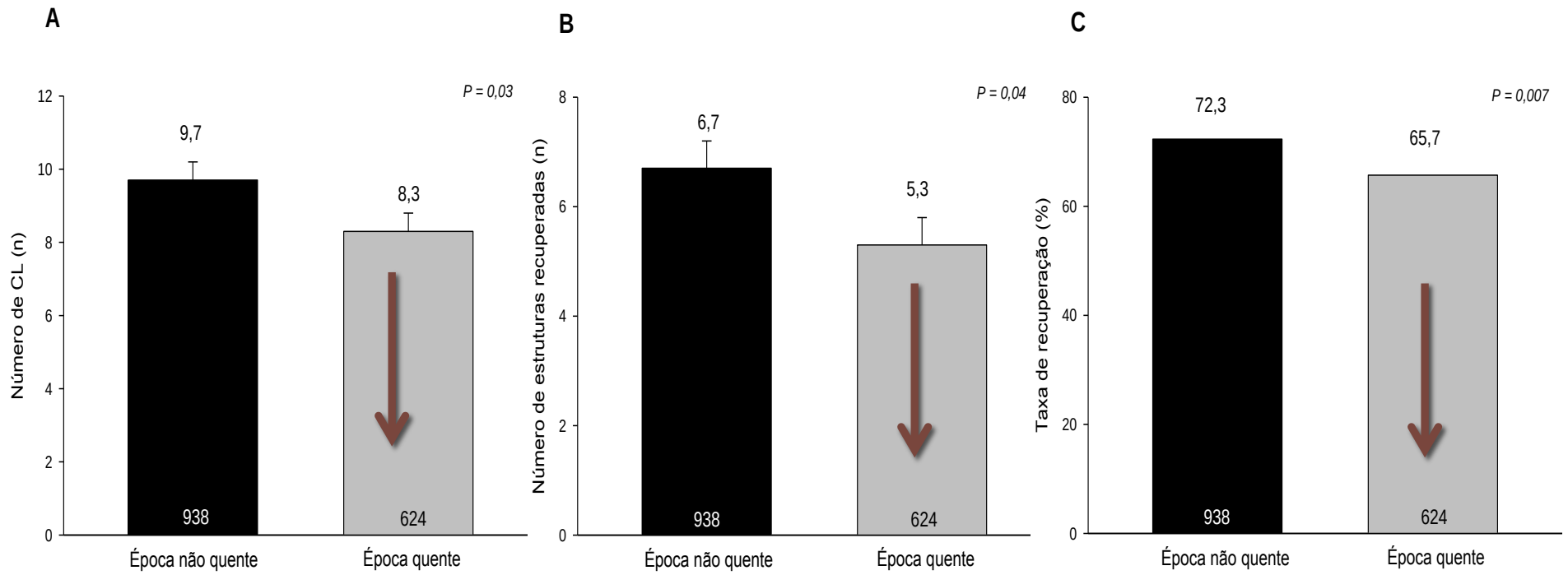
Vieira, 2013

RESPOSTA SUPEROVULATÓRIA
- Época do ano -

Número de CL (n)

Número de estruturas recuperadas (n)

Taxa de recuperação (%)



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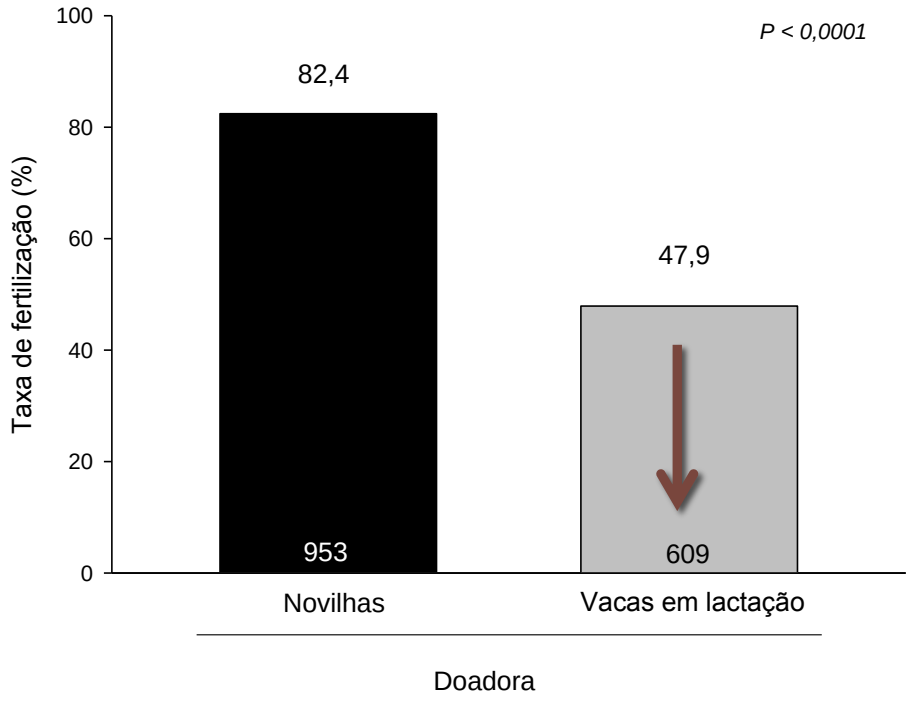
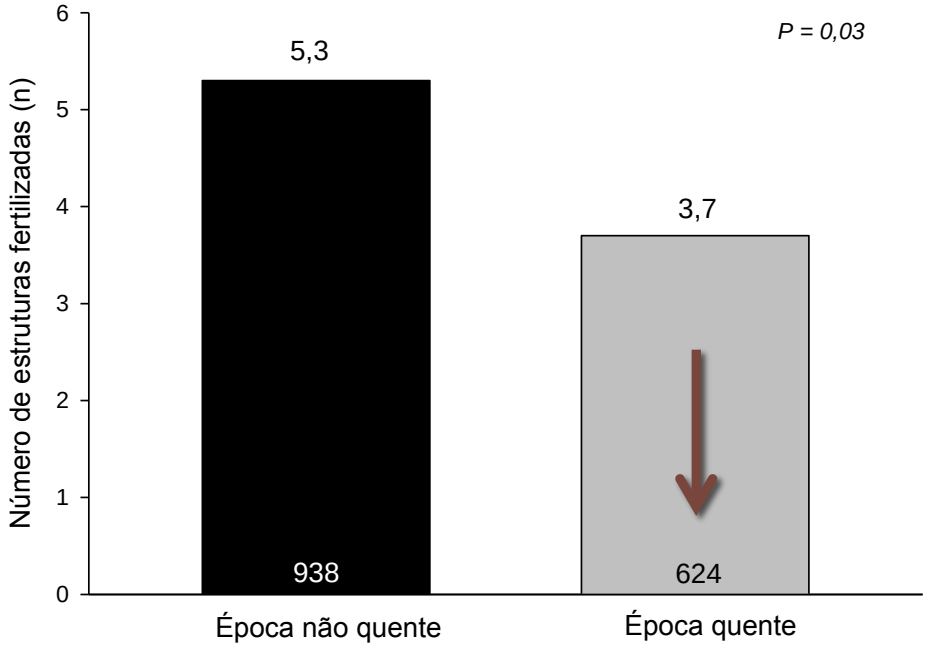
PRODUÇÃO DE EMBRIÕES

Taxa de fertilização (%)



Número de estruturas fertilizadas (n)



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PRODUÇÃO DE EMBRIÕES

	Não quente		Quente		Valor de P		
					Categoria	Época	Categ* Época
Embriões viáveis (n)	4,4 ± 0,4		2,8 ± 0,3		0,16	0,03	0,10
	54,6		44,6				
Embriões grau I e II (n)	1,9 ± 0,2^{Aa}	1,6 ± 0,2^{Bx}	1,6 ± 0,7^{Xa}	0,8 ± 0,1^{Yy}	< 0,0001	0,03	< 0,0001
Embriões degenerados (n)	0,5 ± 0,1		0,8 ± 0,1		0,0006	0,14	0,67

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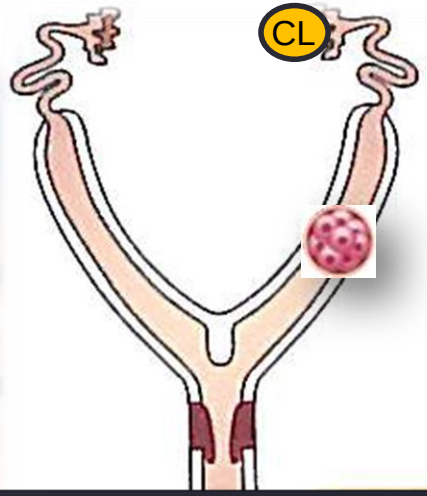
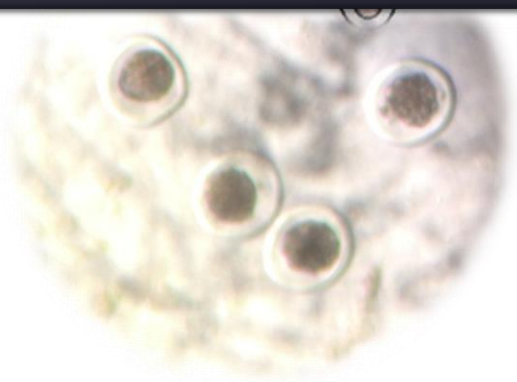
FATORES QUE INTERFEREM NA EFICIÊNCIA DA TRANSFÊNCIA DE EMBRIÃO



4.076 embriões transferidos



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DADOS GERAIS

TAXA DE CONCEPÇÃO AOS 31 DIAS…….. **31,0%** (n =4.076)

TAXA DE CONCEPÇÃO AOS 45 DIAS …… **25,3%** (n =4.076)

PERDA GESTACIONAL……..…….. **18,3%** (n = 1.513)

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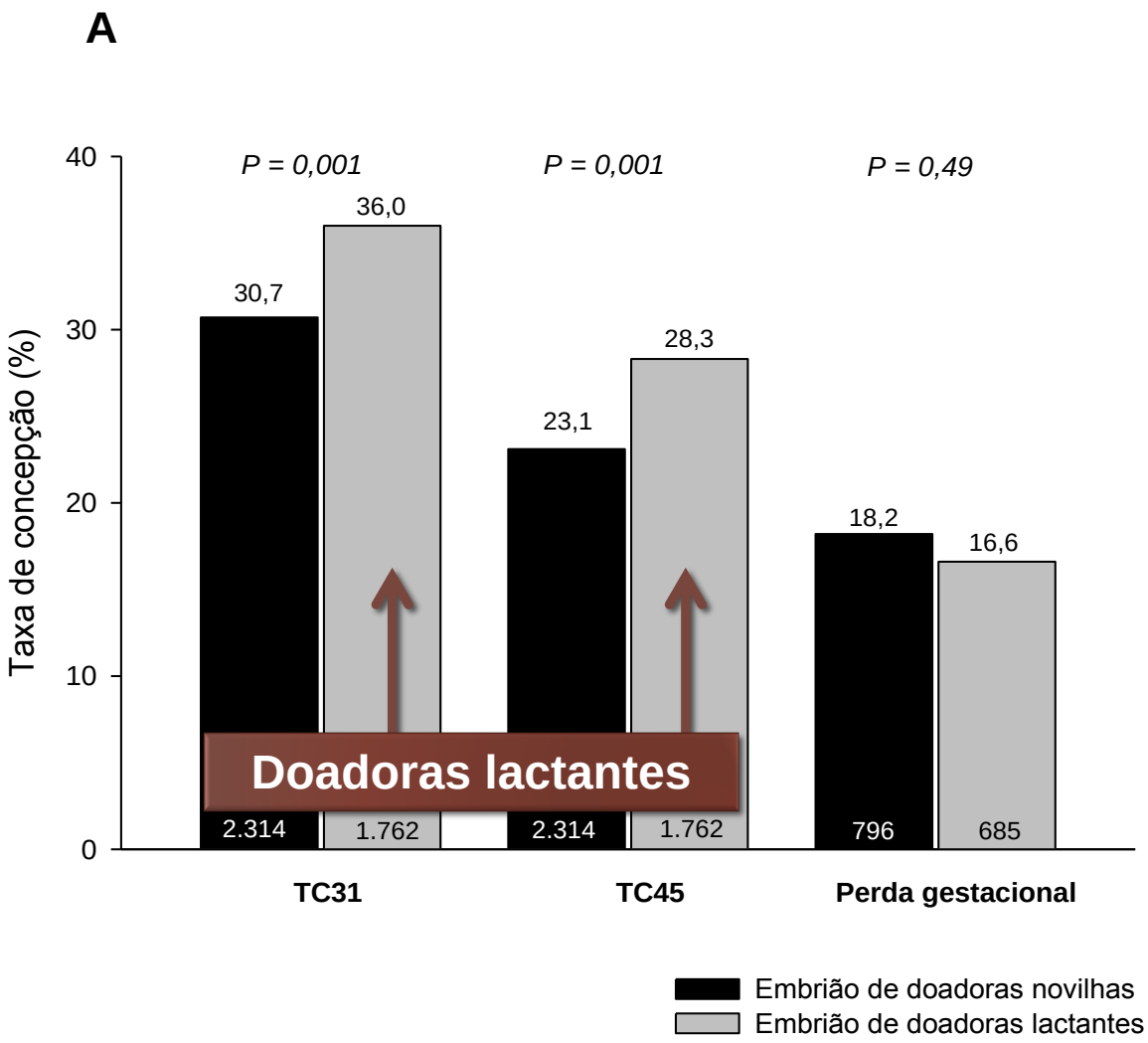
CATEGORIA ANIMAL



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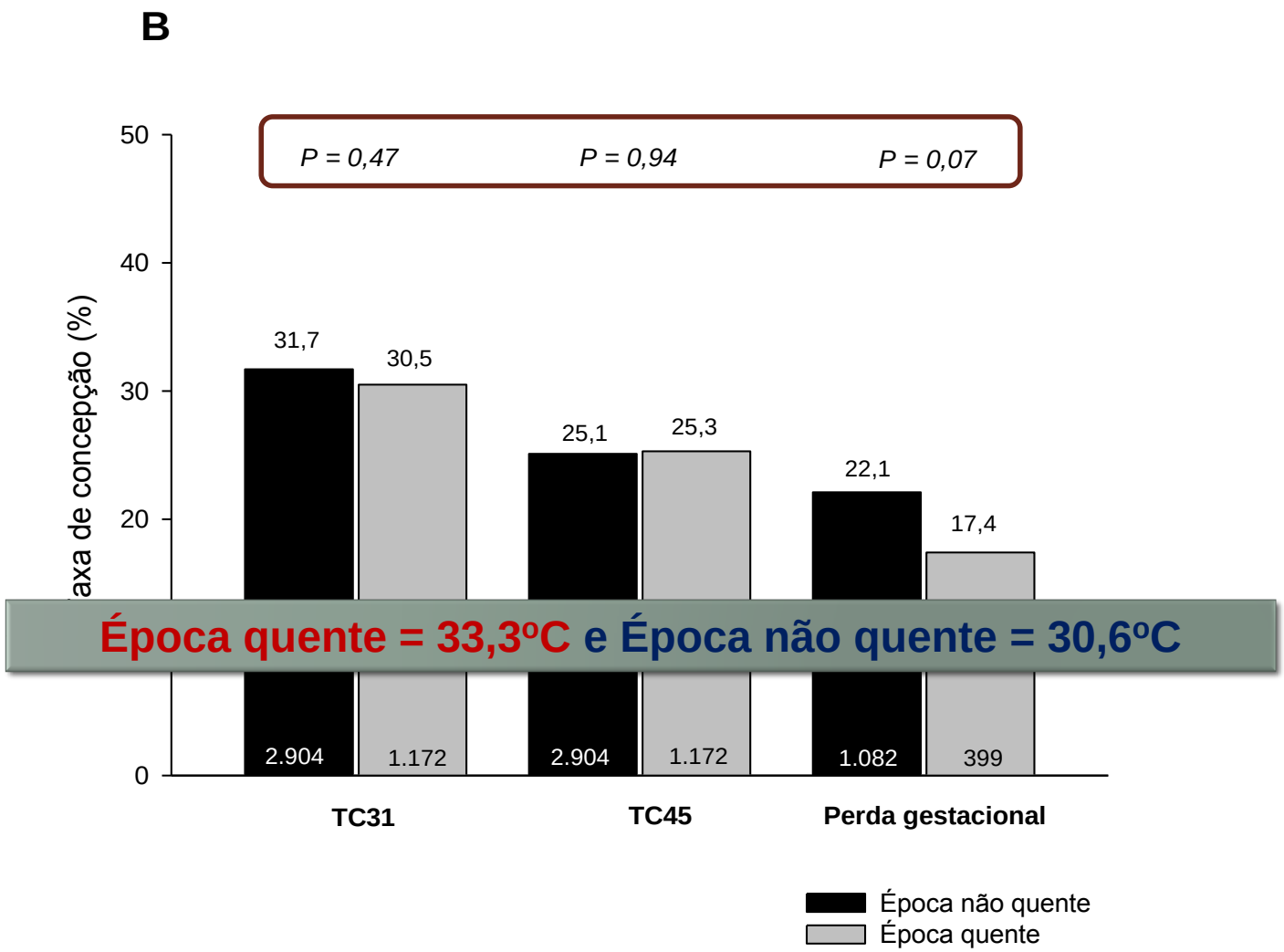
Época do ano



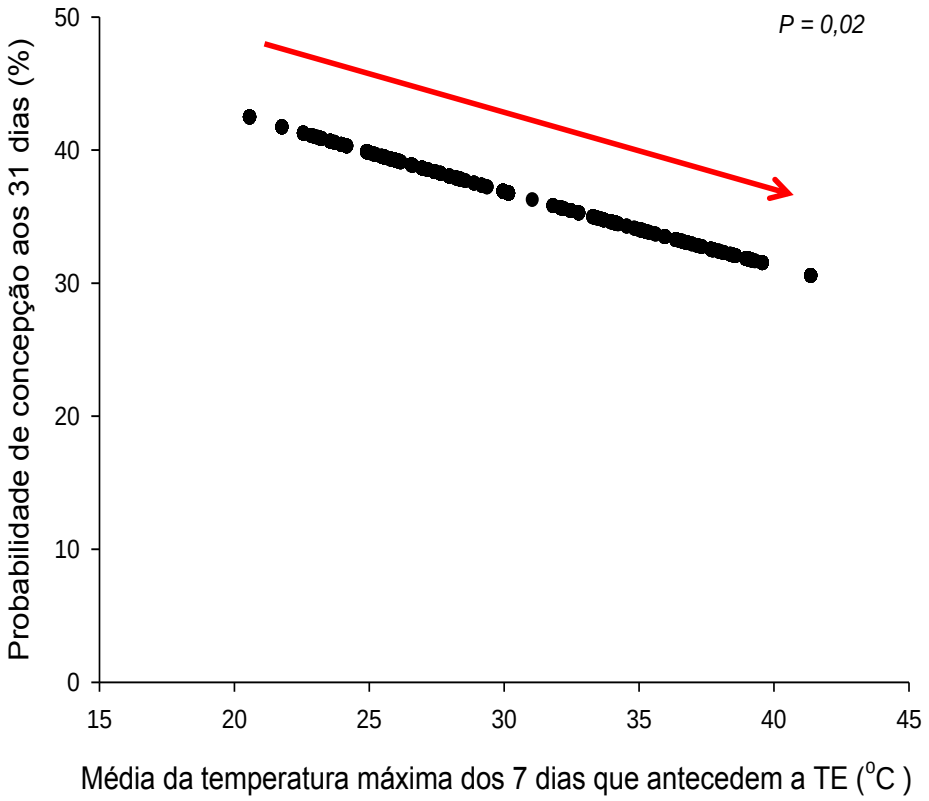
Época quente = 33,3ºC e Época não quente = 30,6ºC

Vieira, 2013

ÉPOCA DO ANO

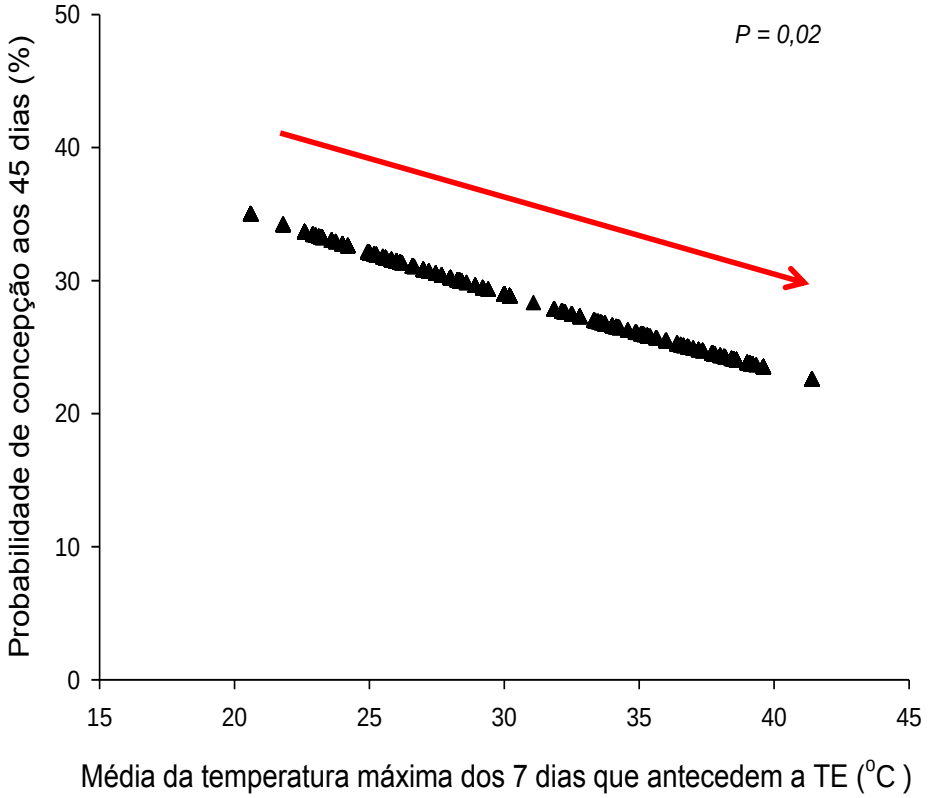
Taxa de prenhez com 30 dias

A



Taxa de prenhez com 60 dias

B



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Conclusão

	CATEGORIA	
	Novilhas	**Vaca em lactação**
Resposta superovulatória	-	+
Taxa de recuperação	-	+
Taxa de fertilização	+	-
Taxa de embriões viáveis	+	-
Taxa de embriões viáveis grau I e II	+	-
Taxa de concepção	-	+

Heat Stress

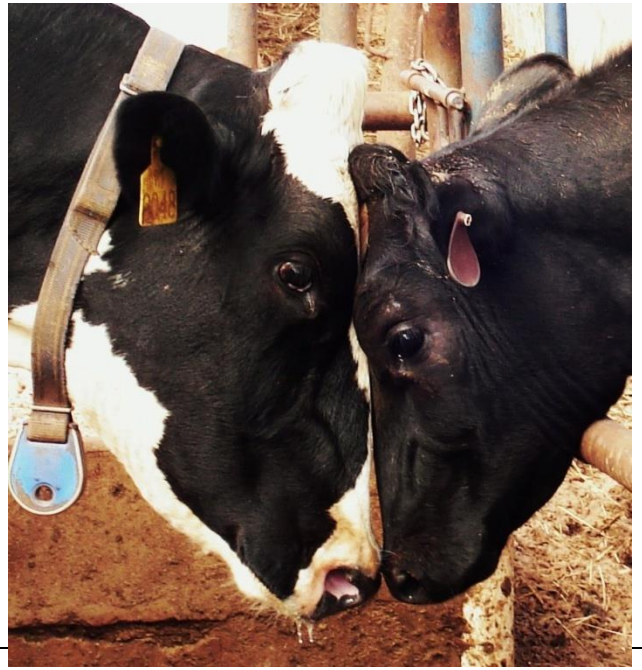
Repeat Breeders

X

Heifers

X

Lactating cows



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doi:10.3168/jds.2010-3904
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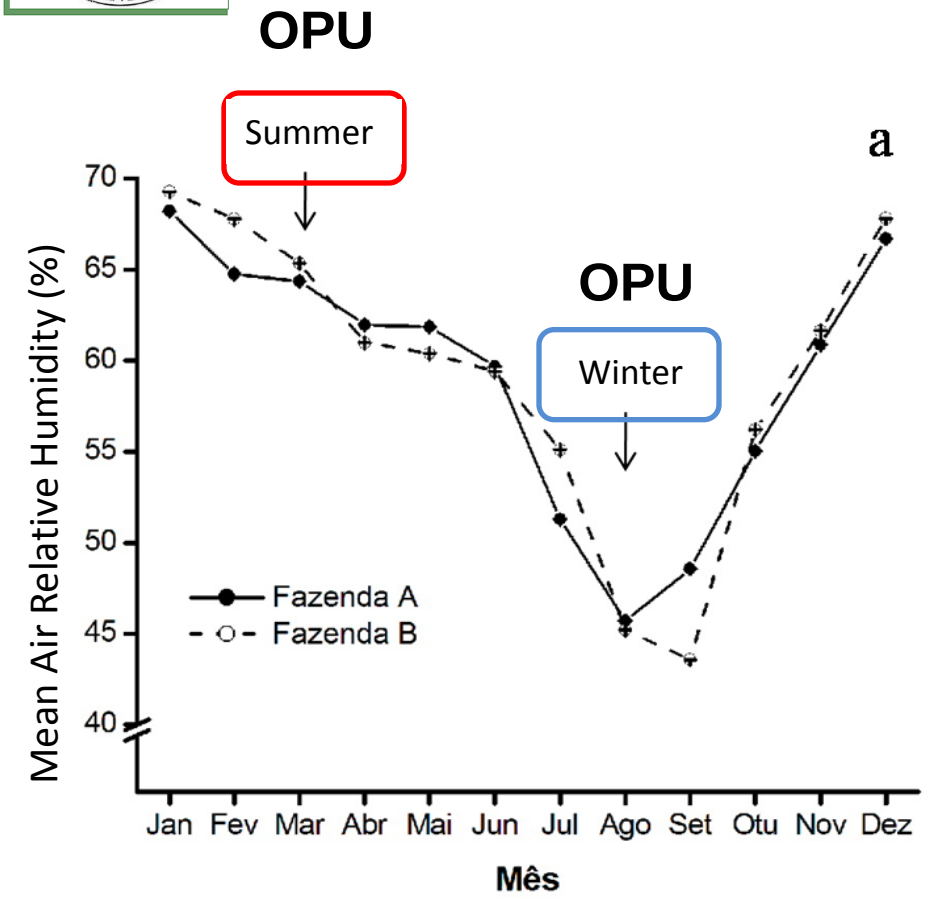
The low fertility of repeat-breeder cows during summer heat stress is related to a low oocyte competence to develop into blastocysts

R. M. Ferreira,*[1,2] H. Ayres,*[1] M. R. Chiaratti,† M. L. Ferraz,‡ A. B. Araújo,‡ C. A. Rodrigues,§ Y. F. Watanabe,# A. A. Vireque,# D. C. Joaquim,# L. C. Smith,‖ F. V. Meirelles,† and P. S. Baruselli*[2]



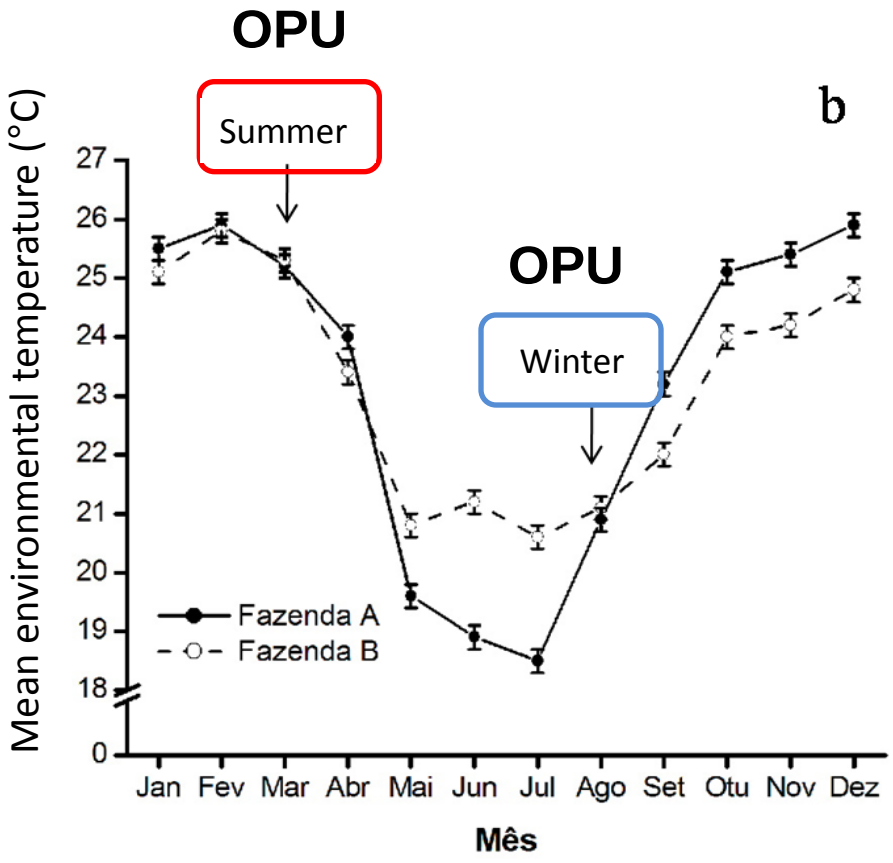
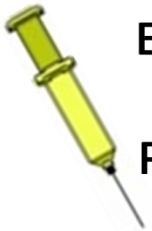


Fig. **Relative Air Humidity** (%) and **Environmental temperature** (°C) during the year of the trial. Definition fo the experimental Summer and Winter.

Ferreira et al., 2011
J. Dairy Sci. 94 :2383–2392

Efeito do estresse calórico nas diferentes categorias



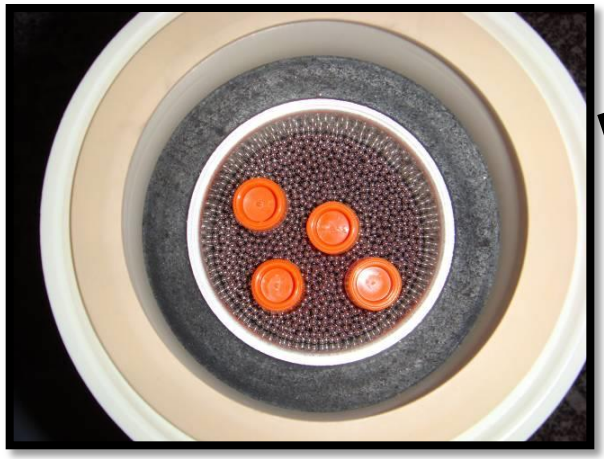
EB (2mg) +
PGF2α +
P4 (50 mg)

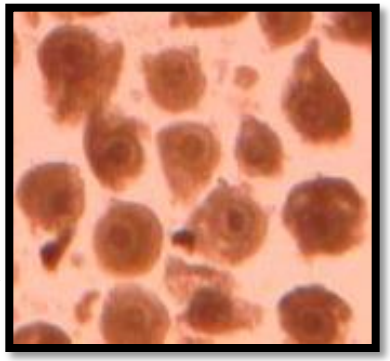
D0

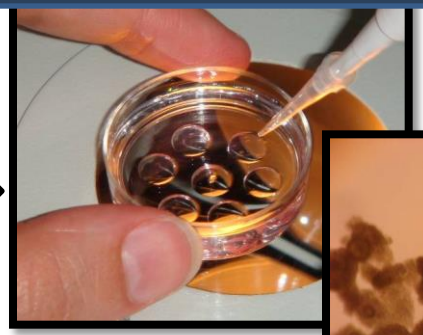
RT, CT, RR

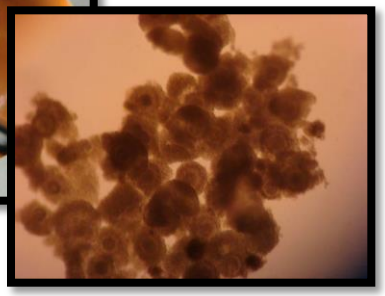
Ferreira et al., 2011
J. Dairy Sci. 94 :2383–2392

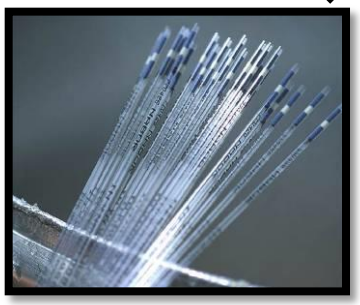
Efeito do estresse calórico nas diferentes categorias

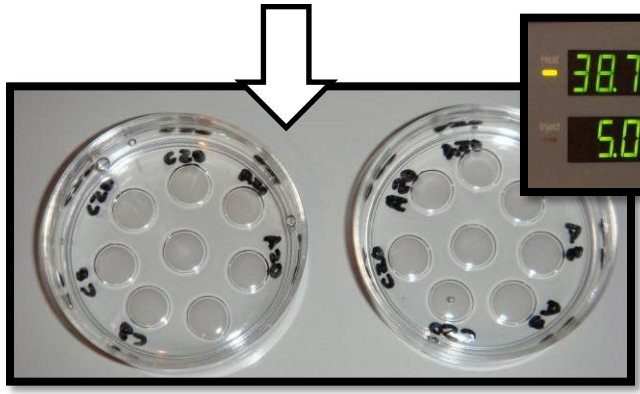






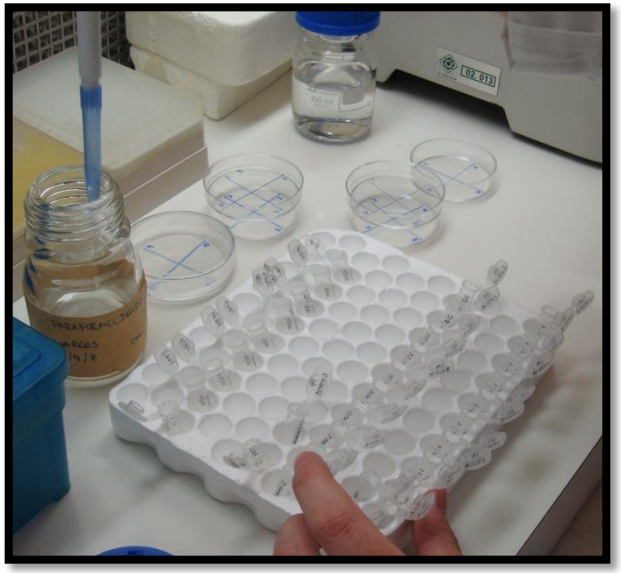


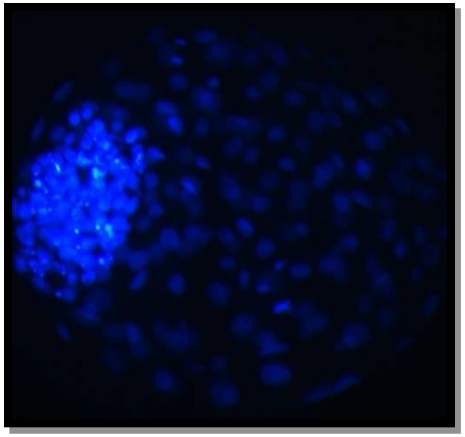


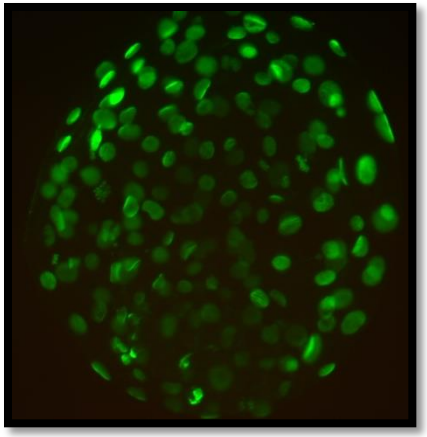


Ferreira et al., 2011
J. Dairy Sci. 94 :2383–2392

Efeito do estresse calórico nas diferentes categorias







Ferreira et al., 2011
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Efeito do estresse calórico nas diferentes categorias

Parâmetros fisiológicos

(Gwazdauskas et al., 1973; Al-Katanani et al., 2002)

aumento de 0,5ºC = Comprometimento do oócito

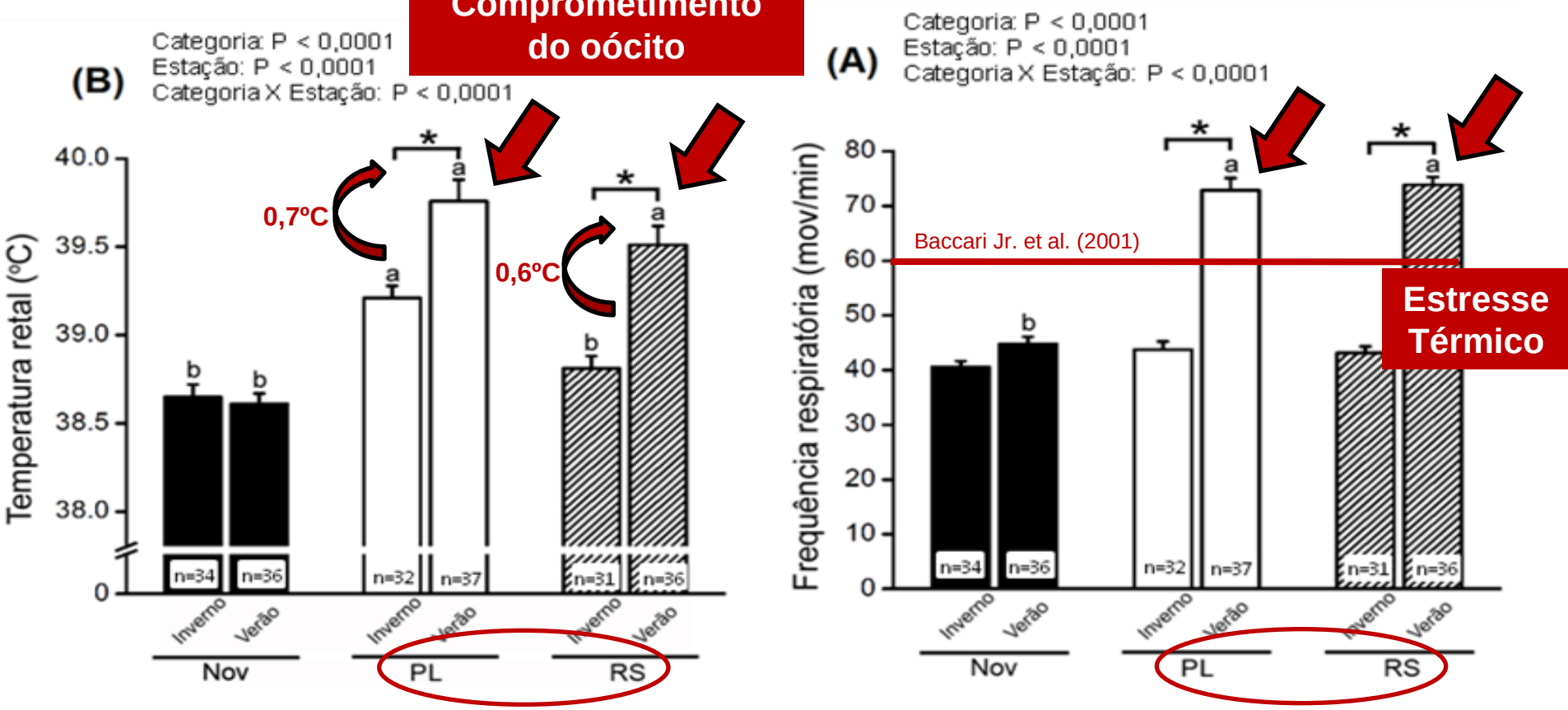


Figura. **Temperatura rectal** (°C) y **Frecuencia respiratória** (mov/min) de hembras Holstein de diferentes categorías (novillas, PL y RS) durante el inverno y el verano

Ferreira et al., 2011 - J. Dairy Sci. 94 :2383–2392

Results

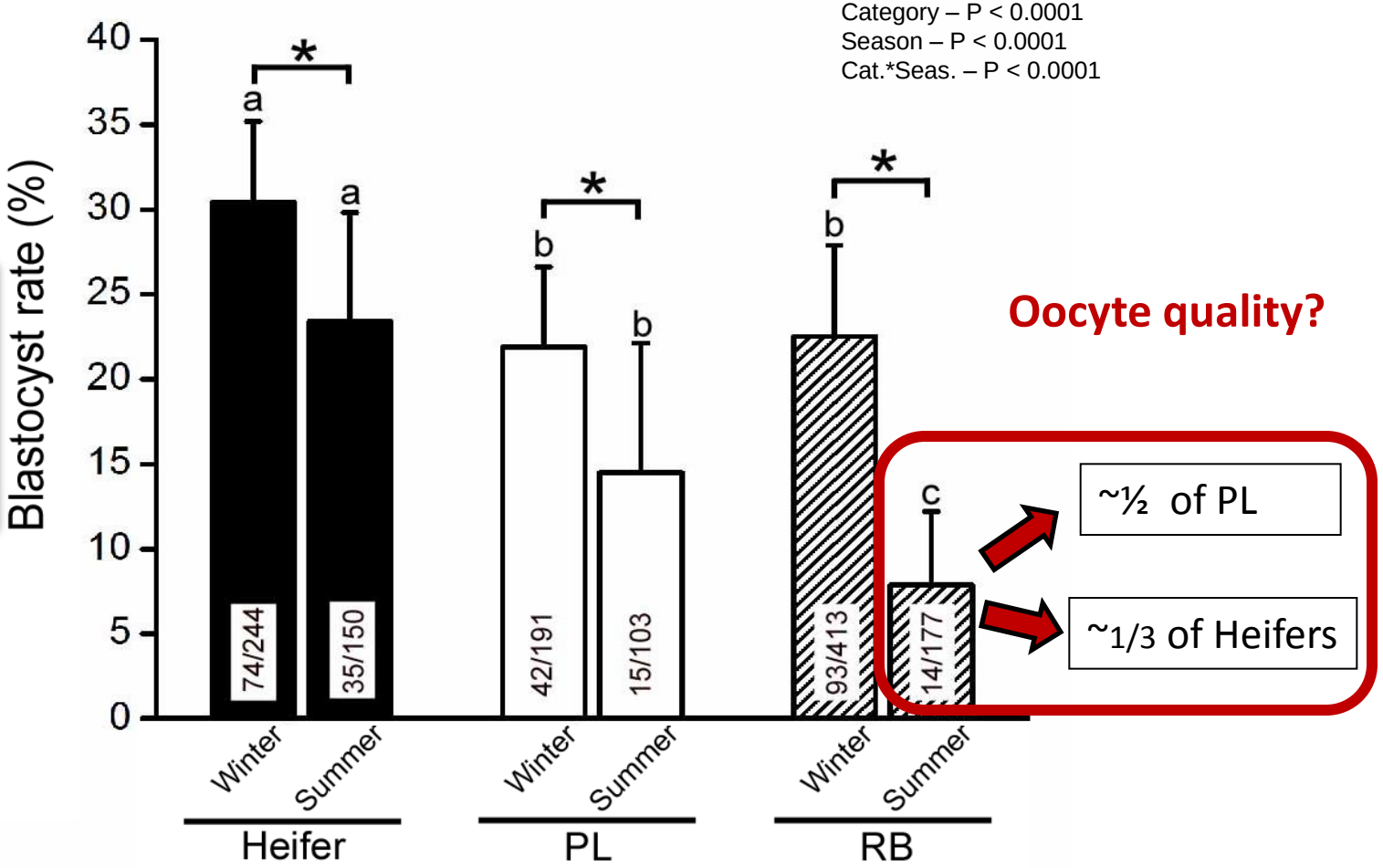
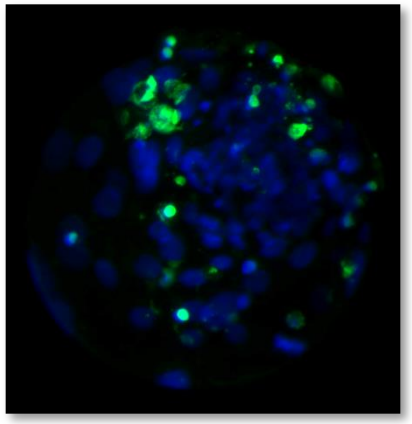


Figura. **Blastocyst rate** of Holstein females of different categories (heifers, PL and RB) durint winter and summer

Ferreira et al., 2011
J. Dairy Sci. 94 :2383–2392

Results



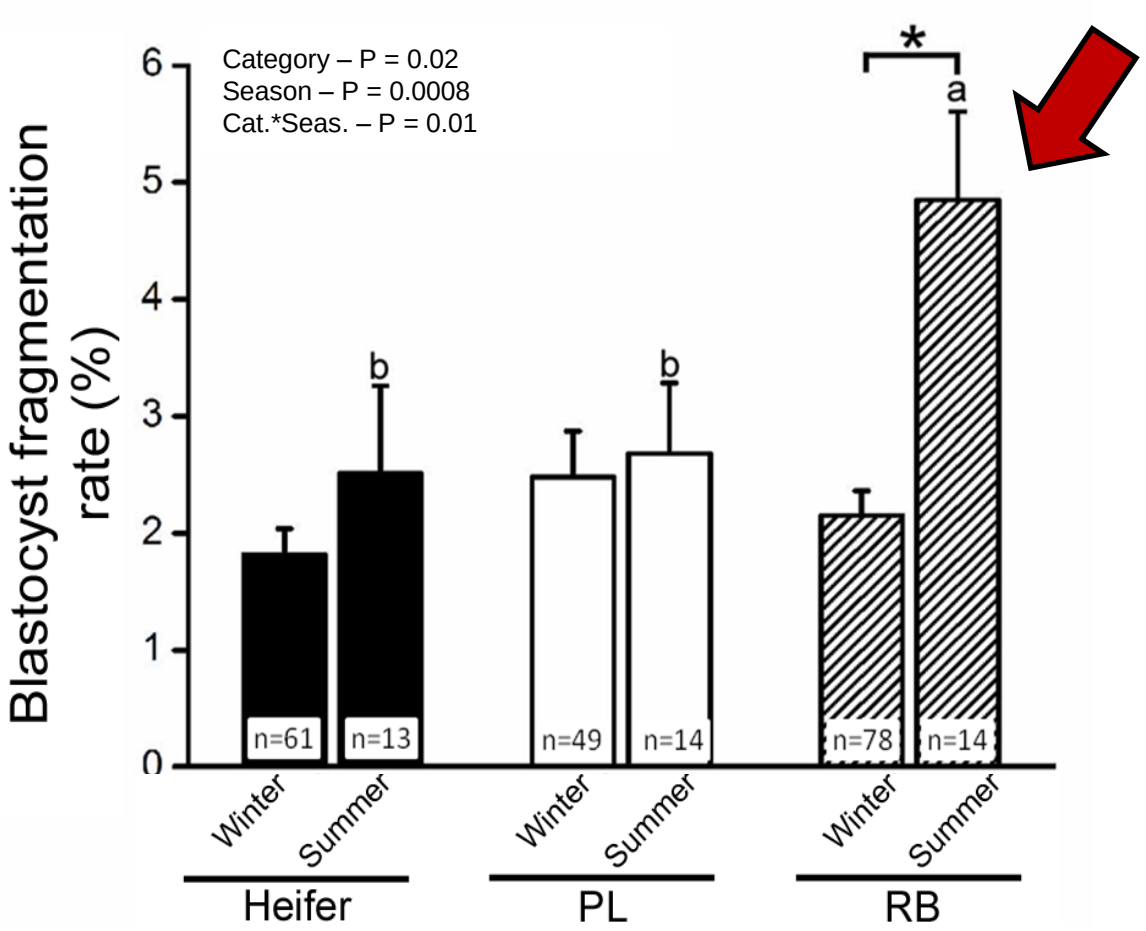


Figura. Fragmentation rate of *in vitro* produced blastocysts of Holstein females of different categories (heifers, PL and RB) durint winter and summer

Number of animals: Heifers= 61 and 13; PL = 49 and 14; RB = 78 and 14

Ferreira et al., 2011
J. Dairy Sci. 94 :2383–2392

Resultados

Repetidoras de serviço
Ativação de mecanismos pró-apoptóticos!

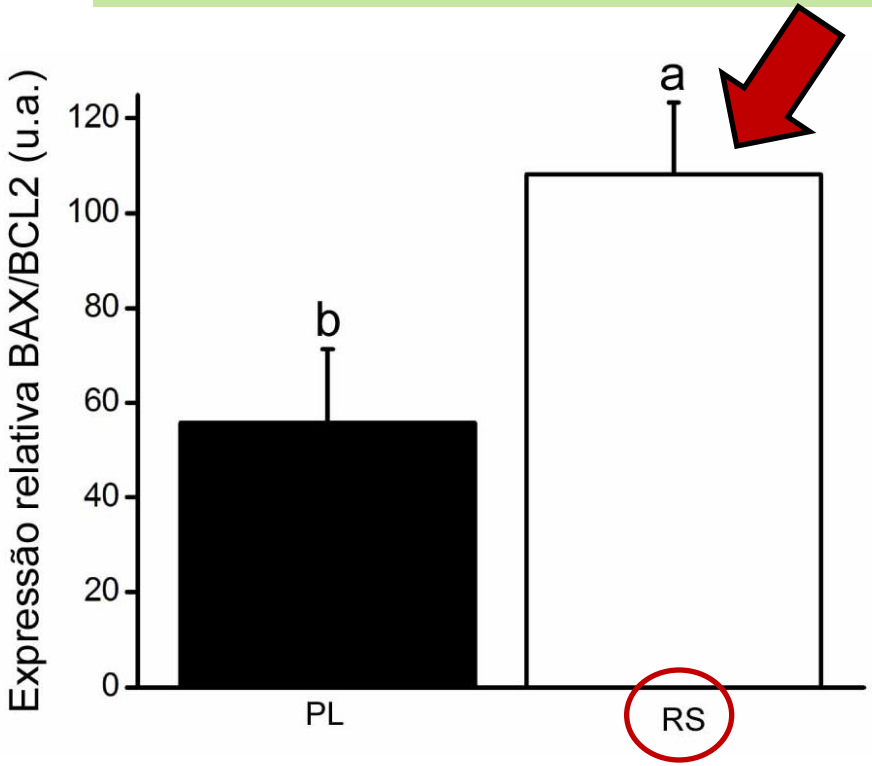


Figura. **Razão** de expressão entre os genes **BAX e BCL2** em oócitos de vacas Holandesas PL e RS, independentemente da estação.

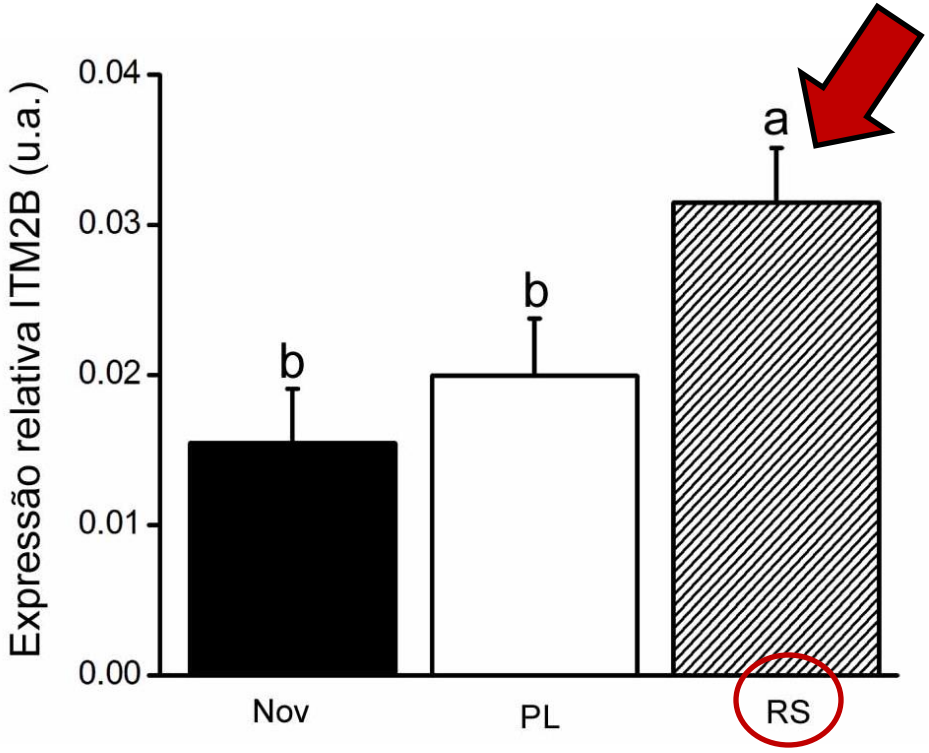


Figura. Expressão do **ITM2B** em oócitos de novilhas e vacas Holandesas PL e RS, independentemente da estação do ano.

Resultados

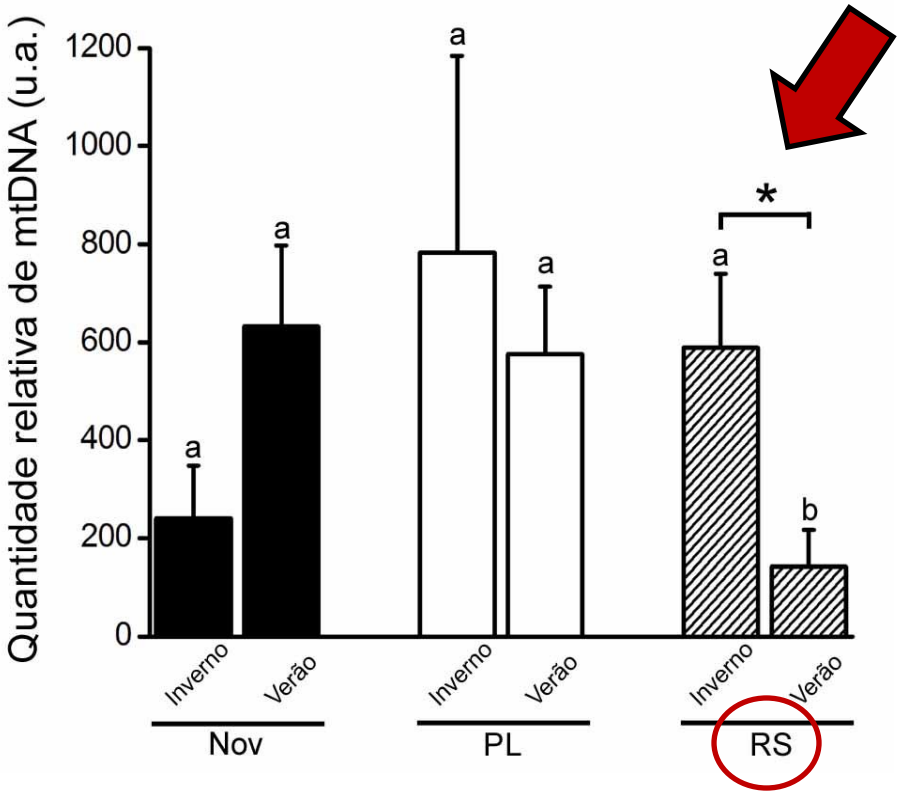


Figura. **Conteúdo relativo de mtDNA** em oócitos de novilhas, PL e RS Holandesas durante o inverno e o verão.

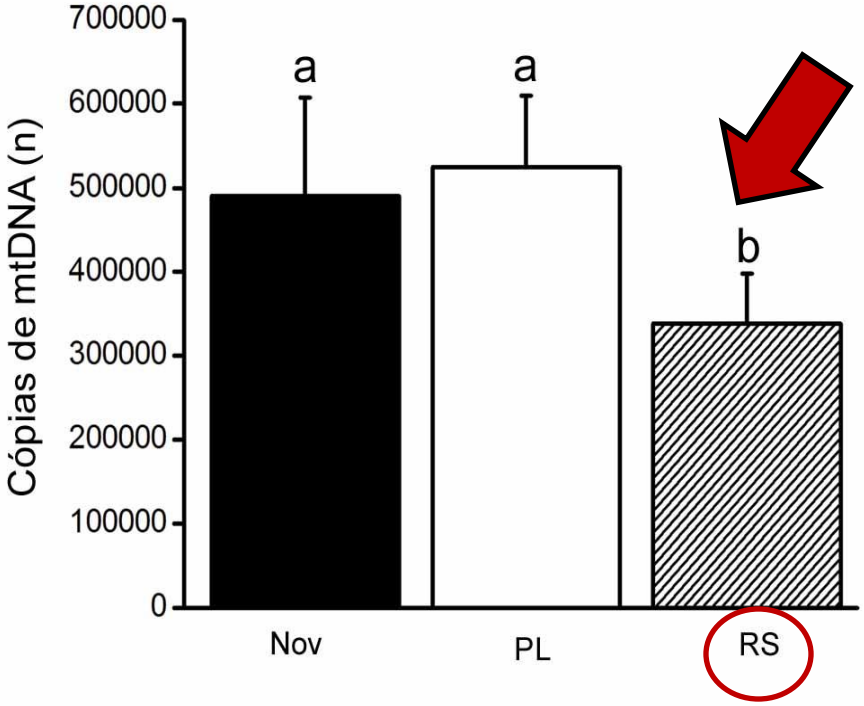
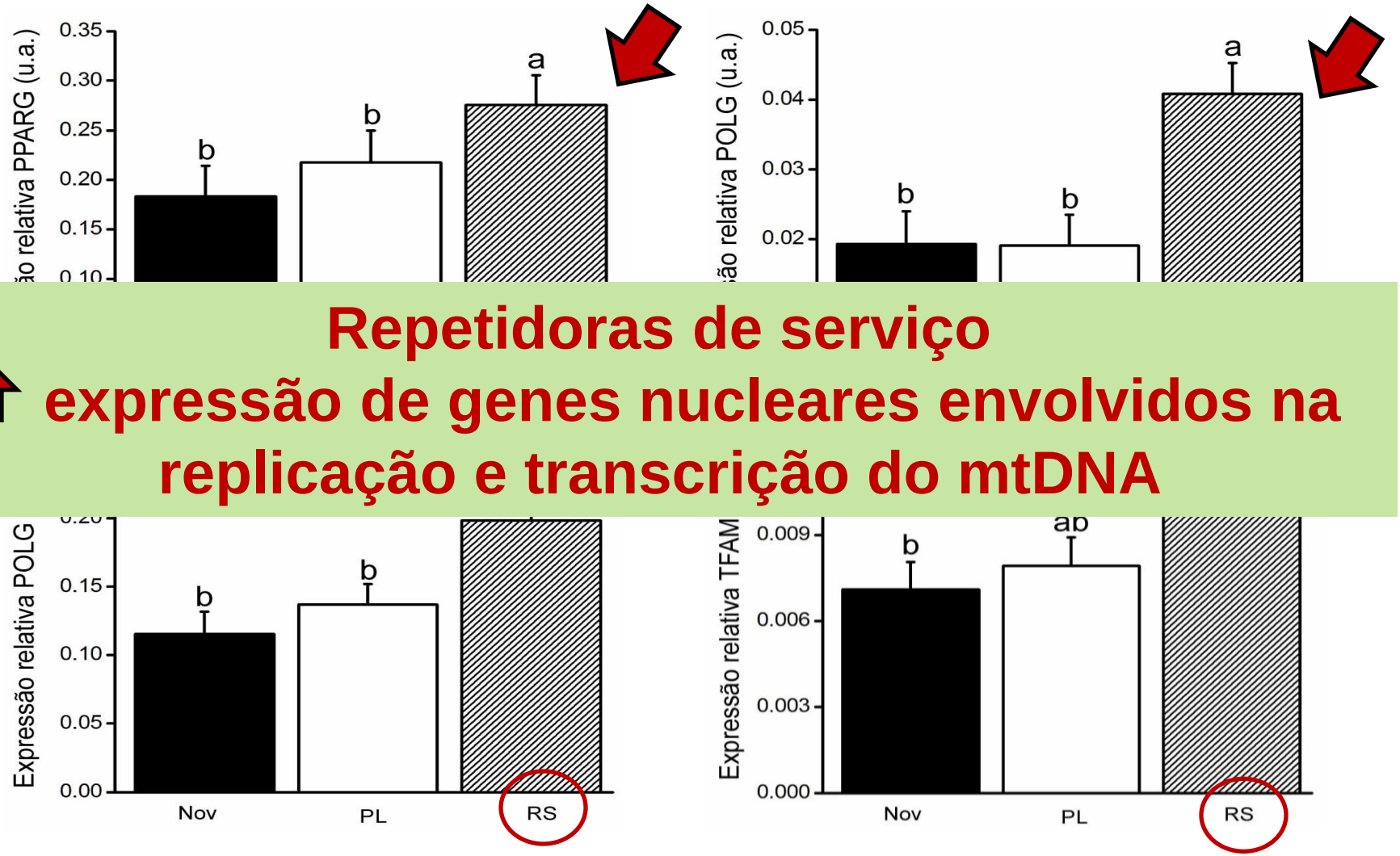


Figura. **Conteúdo absoluto de mtDNA** em oócitos novilhas, PL e RS Holandesas durante o verão.

Resultados



Repetidoras de serviço

↑ expressão de genes nucleares envolvidos na replicação e transcrição do mtDNA

Figura. Expressão do **PPARG, POLG, POLG2, TFAM** em oócitos de novilhas e vacas Holandesas PL e RS, independentemente de estação do ano.

Resultados

VERÃO
Comprometimento na expressão de genes que codificam chaperonas

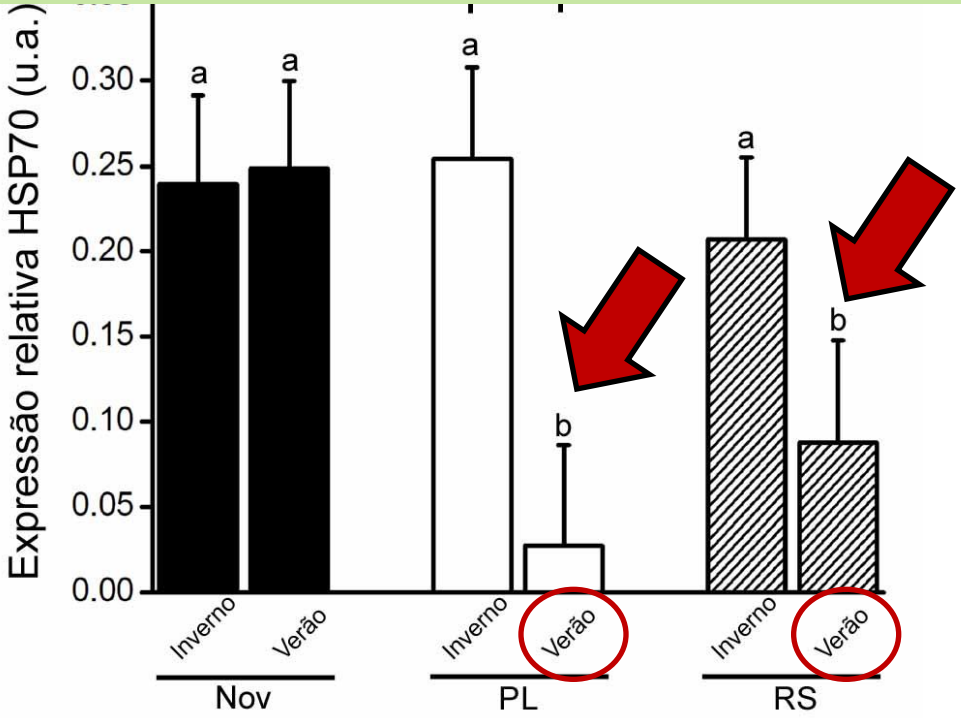


Figura. Expressão do **HSP70** em oócitos de novilhas e vacas Holandesas PL e RS, no verão e inverno.

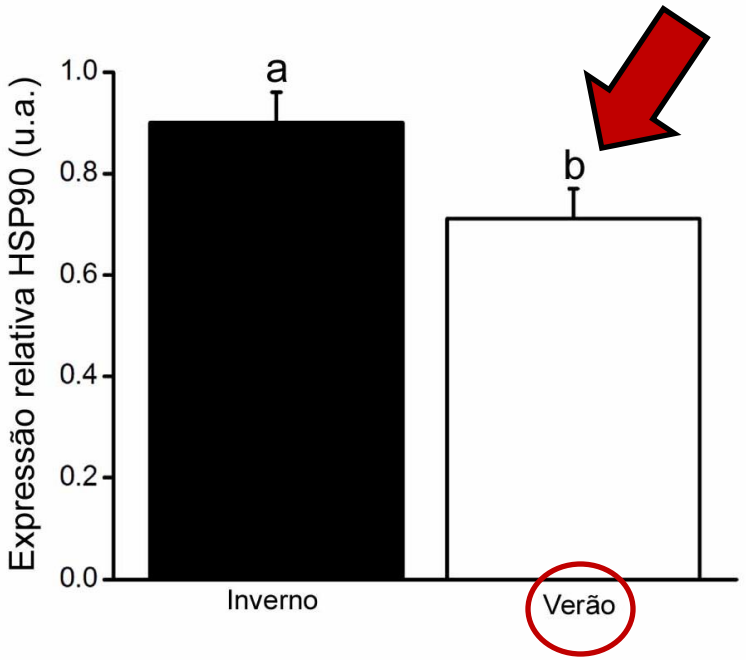
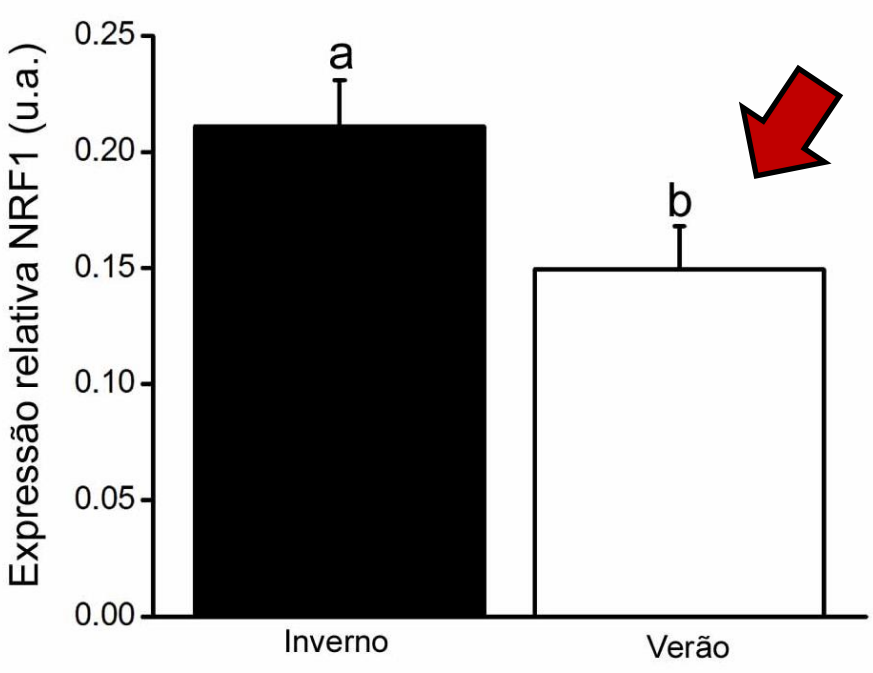


Figura. Expressão do **HSP90** em oócitos de novilhas e vacas Holandesas no verão e inverno.

Resultados

VERÃO

↓ expressão de genes nucleares envolvidos na replicação/transcrição do mtDNA



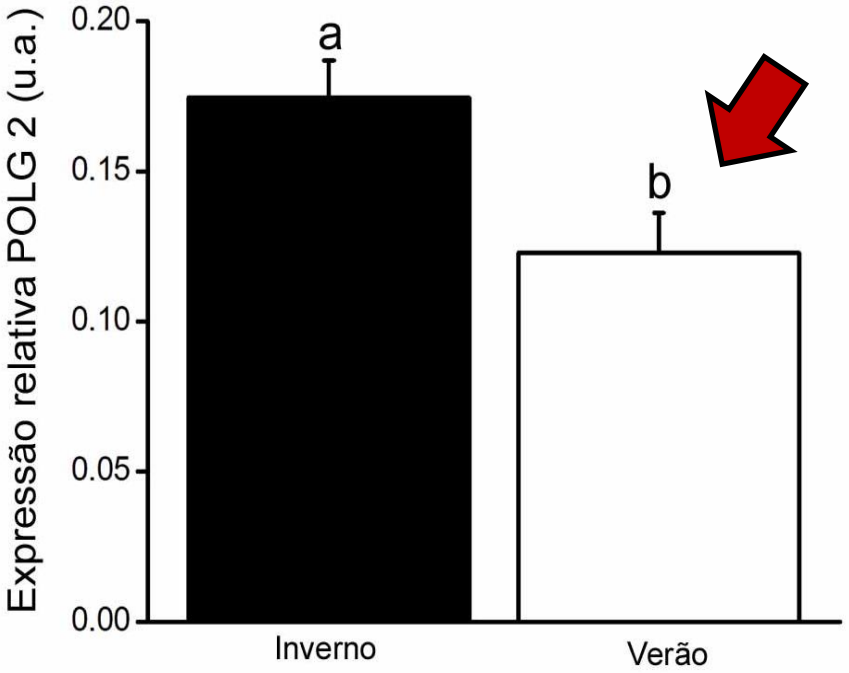
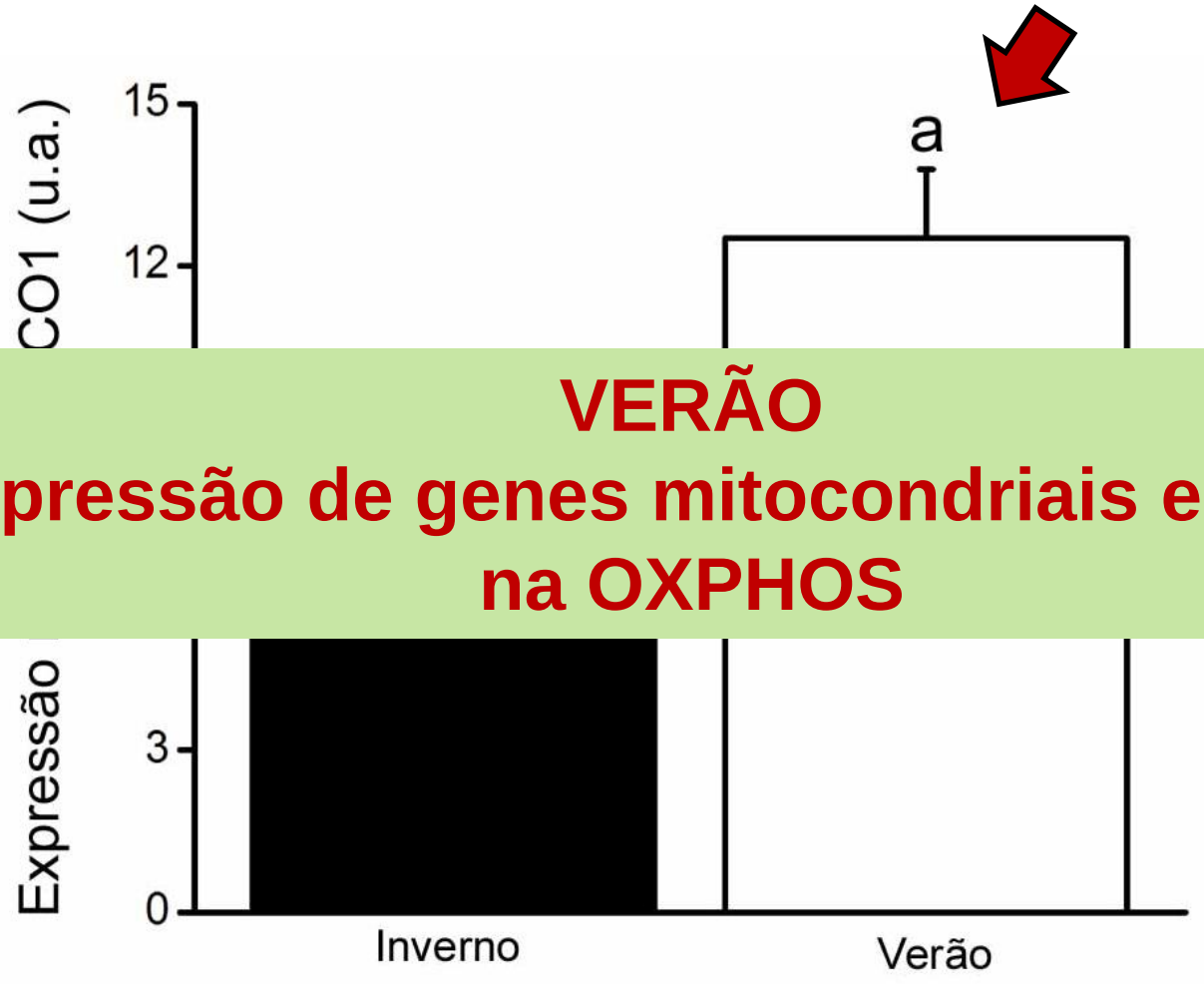


Figura. Expressão do **NRF1 e POLG2** em oócitos de novilhas e vacas Holandesas no verão e inverno.

Resultados

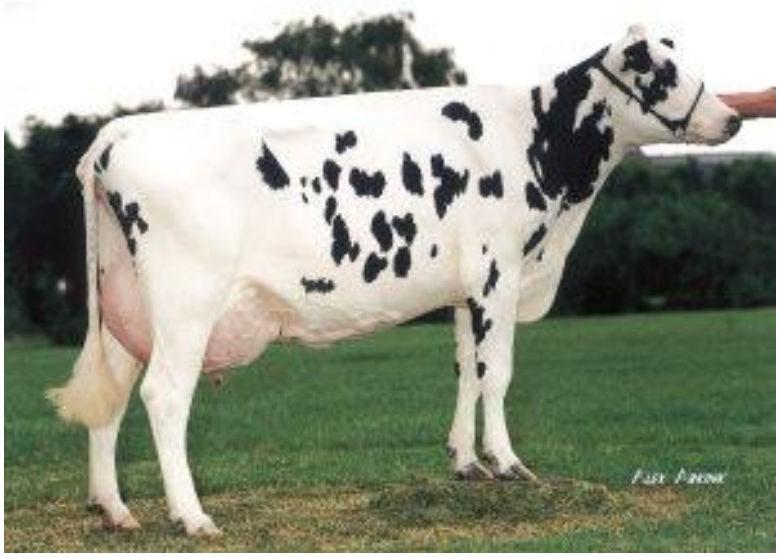


VERÃO

↑ expressão de genes mitocondriais envolvidos na OXPHOS

Figura. Expressão do **MTCO1** em oócitos de novilhas e vacas Holandesas no verão e inverno.

ESTUTUDO RETROSPECTIVO

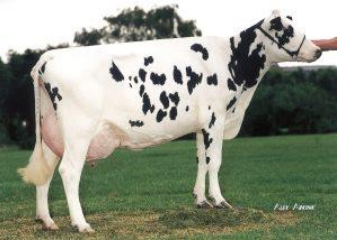


SUPEROVULAÇÃO
ou
OPU /PIV

X

ÉPOCA DO ANO

(Verão vs Inverno)



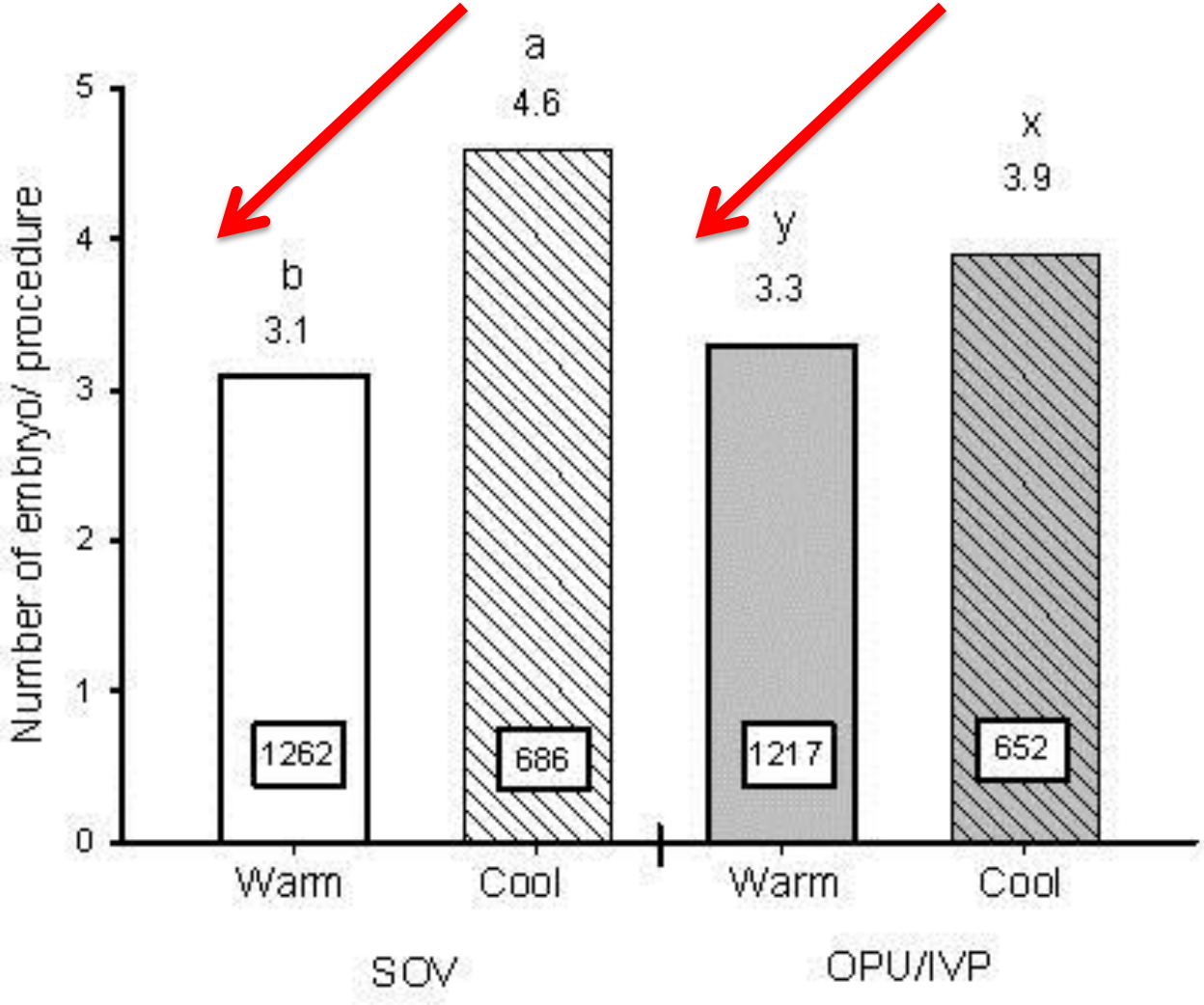


Fig. Embryo production of Holstein cattle (cows and heifers) subjected to superovulation (*in vivo* production; n=1948) or OPU/IVP (*in vitro* production; n = 1869 donors selected by ovarian follicular population - > 20 follicles) during the hot (spring/summer) or cool (autumn/winter) season, per procedure (SOV or OPU/IVP). $^{a,b/x,y}$ Within a procedure, bars without a common letter differed ($p<0.001$). Numbers in boxes indicate the number of procedures (SOV or OPU/IVP).

Adapted from Vieira et al. (2011) and Pontes et al. (2012)

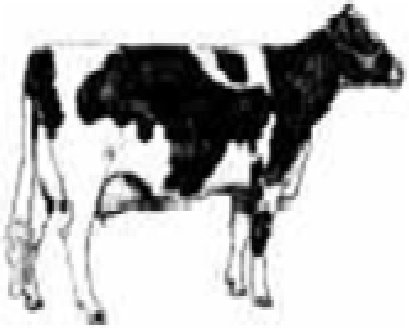
Conception rate of heifers, PL and RB cows submited to the same FTAI protocol and inseminated with the same semen batch during the summer and winter

Heifer; n=149

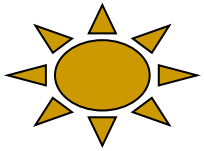
X

PL, n=198

X



RB; n= 233



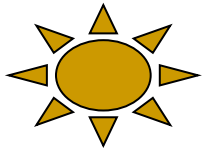
Summer

n=295

X

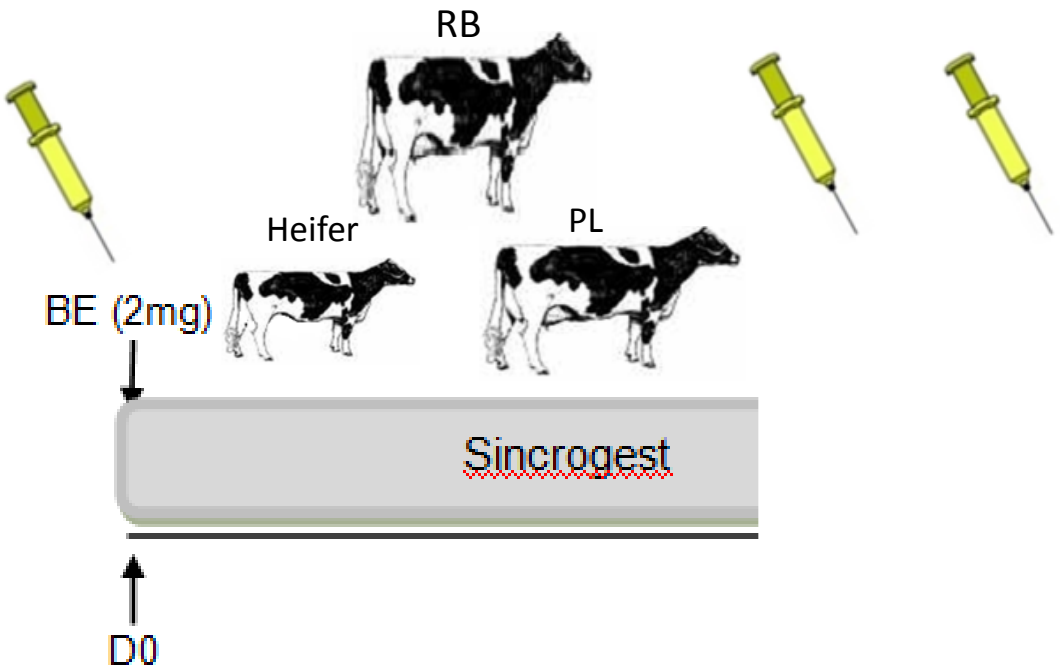
Winter

n=285



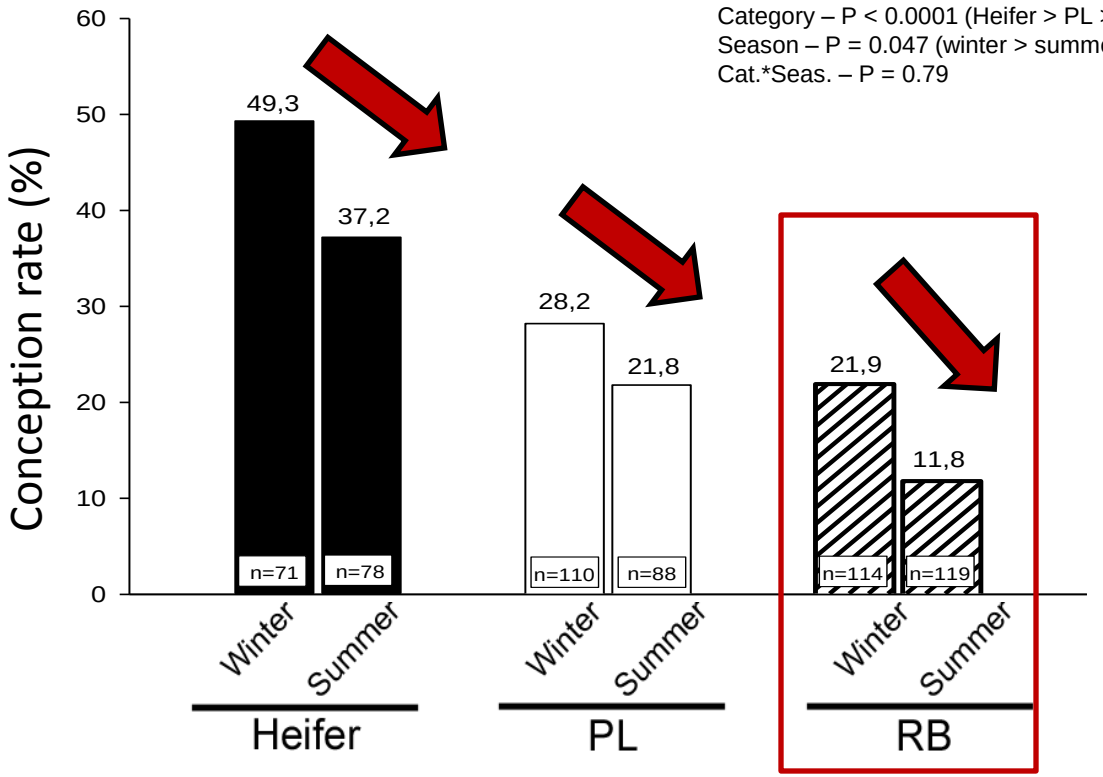
Summer

Winter



Categories	Heifers	PL	RB	P Values
	43.0%[a]	25.4%[b]	16.7%[c]	< 0.0001

Season	Winter	Summer	
	30.8%	21.8%	0.05



Ferreira et al., 2012

3.3 - Influence of donor nutrition on the efficiency of OPU-IVP programmes

Cows fed diets to meet:

100% or 170% of energy requirement for maintenance

EXPERIMENTAL DESIGN

GLUCOSE TOLERANCE TEST

MAINTENANCE (M) DIET

Maintenance diet (M)	Maintenance diet - 100% M

n=7

OPU	OPU	OPU	OPU	OPU	OPU	OPU	OPU	OPU
0	7	21	35	49	63	77	91	105	119

HIGH ENERGY (HE) DIET

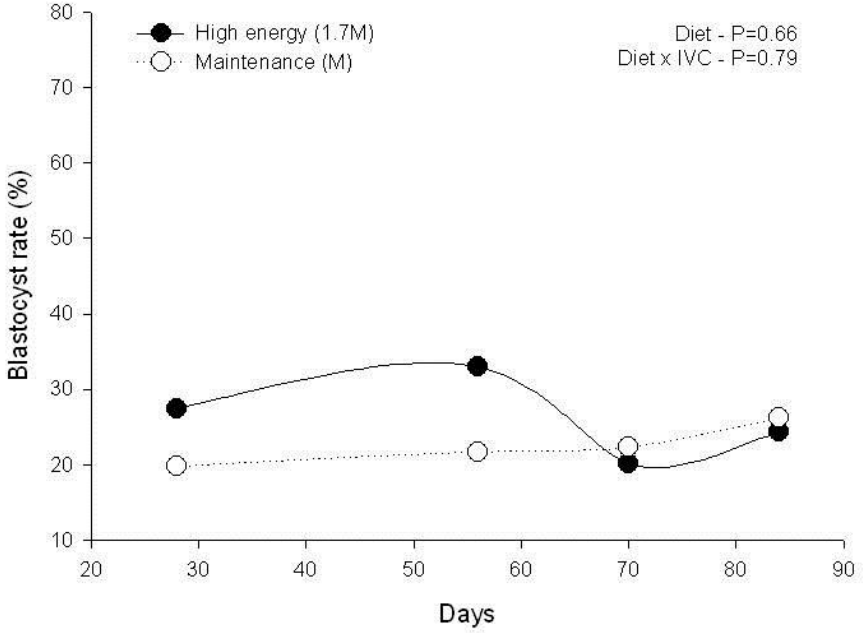
Maintenance diet (M)	High energy - 170% M

n=7

OPU	OPU	OPU	OPU	OPU	OPU	OPU	OPU	OPU
0	7	21	35	49	63	77	91	105	119

Days

IVC - DIET



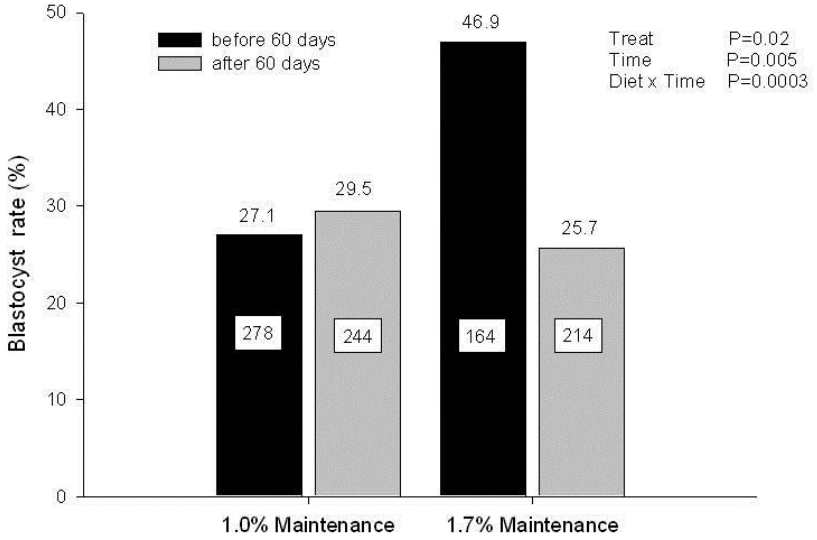


Fig. Percentage of blastocyst non-lactating Gir cows fed diets to meet 100% or 170% of energy of maintenance during 114 days.

Adapted from Sales (2011)

GLUCOSE TOLERANCE TEST

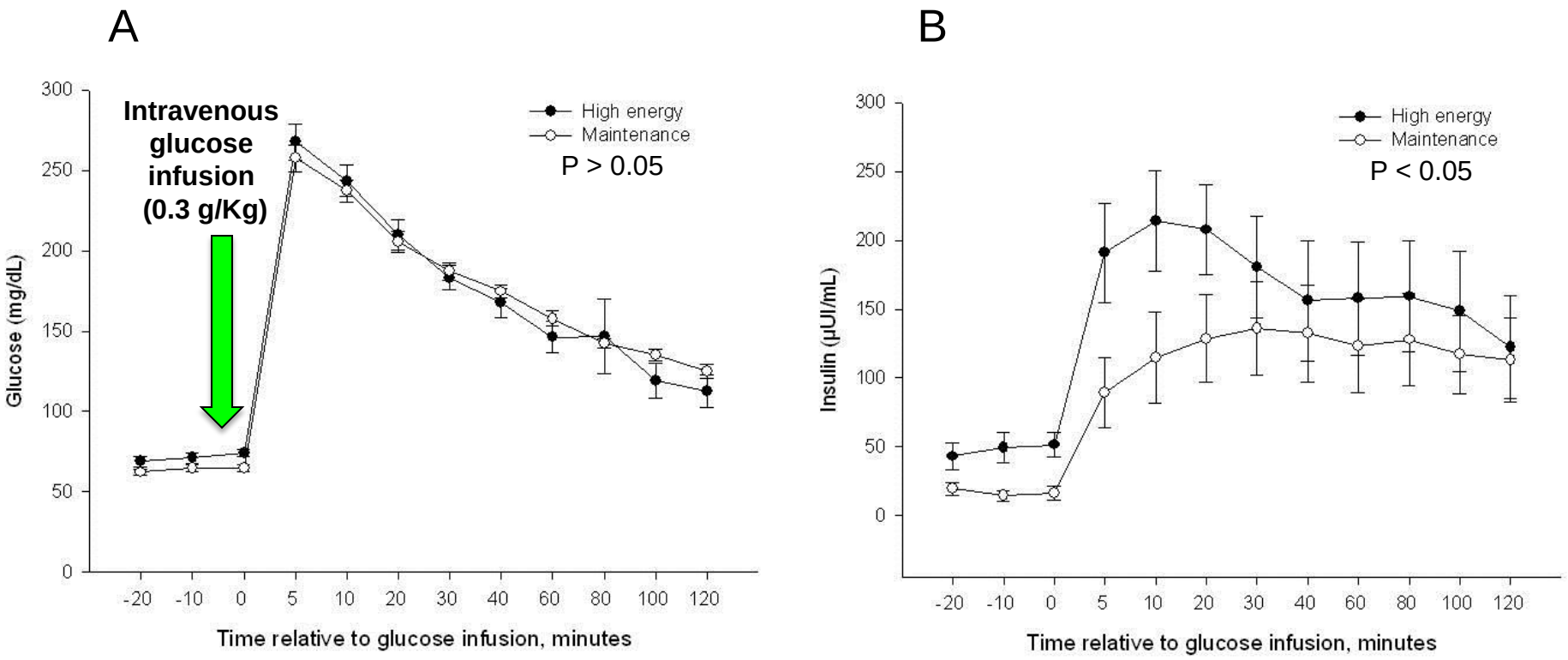


Figure. Circulating concentrations of glucose (A) and insulin (B) in non-lactating Gir cows fed diets to meet 100% or 170% of energy of maintenance during 114 days.

Adapted from Sales (2011)

GENE TRANSCRIPTS

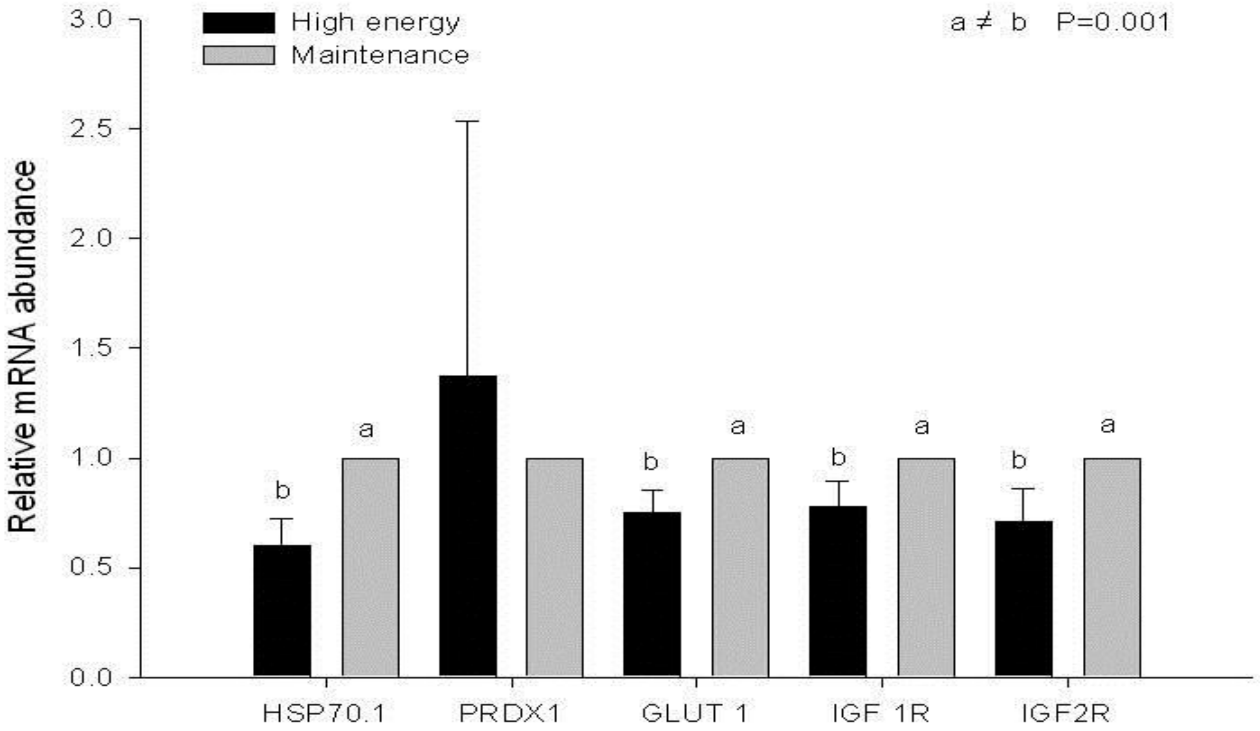
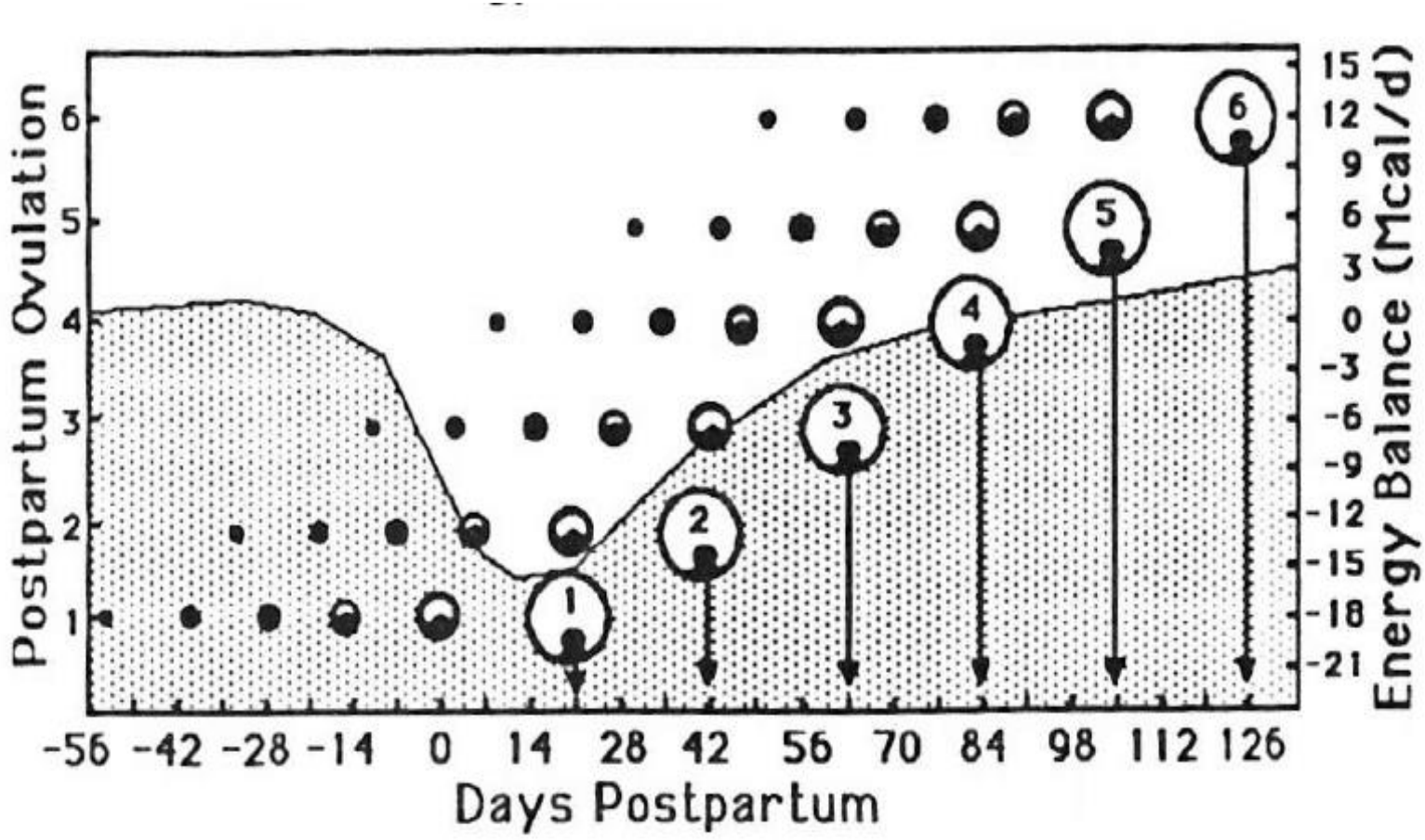


Figure. Relative abundance of gene transcripts (Real Time PCR) related to cellular stress (PRDX1, HSP70.1) and cellular metabolism (GLUT1, IGF1R and IGF2R) in oocytes of non-lactating cows fed diets to meet 100% (reference) or 170% of energy of maintenance (oocytes harvested 114 days after the beginning of diet).

Adapted from Sales (2011)

Efeito do período pós parto na qualidade do oócito e na produção in vitro de embriões de vacas Holandesas

“TEORIA DE BRITT”



Britt, 1992

INFLUÊNCIA DAS CONCENTRAÇÕES DE AGNE NA QUALIDADE OOCITÁRIA E PRODUÇÃO *IN VITRO* DE EMBRIÕES DE VACAS HOLANDESAS NO INÍCIO DA LACTAÇÃO

Mestrando: Rodrigo Vasconcellos Sala

Orientador: Prof. Dr. Pietro Sampaio Baruselli

Departamento de Reprodução Animal – VRA/FMVZ-USP

JUNHO/2013

Material e métodos

- Realizado na Fazenda Santa Rita (Agrindus S/A) – Descalvado/SP

Agrindus S/A

Desde 1945

Sala, 2013

bioembryo

- ✓ Aspiração realizada pelo mesmo técnico.
- ✓ Sêmen utilizado: Touro e partida iguais.

Sala, 2013

➢ **Vacas Holandesas pós-parto (n= 30)**

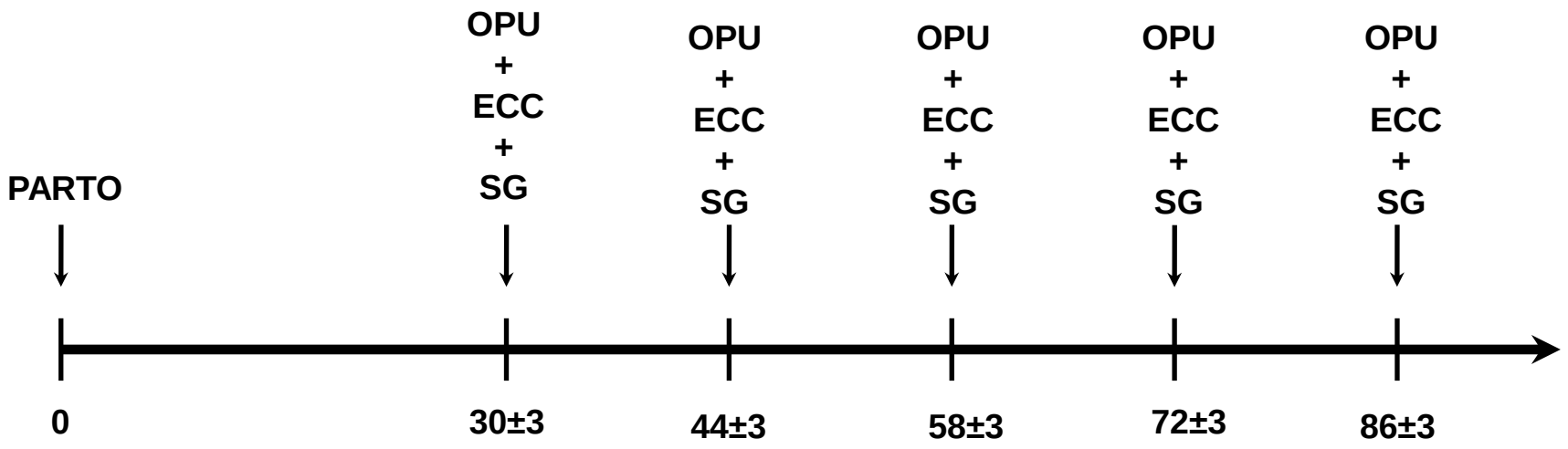


Figura 3 – Desenho experimental das aspirações foliculares realizadas nas vacas Holandesas no início da lactação.

Sala, 2013

Tabela 4 - Efeito dos dias em lactação (DEL) sobre a produção *in vitro* de embriões em vacas Holandesas - Descalvado, SP - 2011

	TEMPO (DEL)					*P*		
	30±3	44±3	58±3	72±3	86±3	Trat	Temp	Trat*Temp
Número de OPU	26	26	26	26	26			
Número de estruturas clivadas	4,8 ± 1,3	4,0 ± 0,8	3,8 ± 1,1	5,2 ± 1,7	5,8 ± 1,6	0,45	0,31	0,65
Taxa de clivagem (%)	54,1 (124/229)	51,2 (104/203)	53,5 (100/187)	58,9 (135/229)	62,8 (152/242)	0,95	0,80	0,92
Número de blastocistos no D8	0,4 ± 0,2	0,7±0,3	0,8 ± 0,3	0,9 ± 0,7	1,2 ± 0,7	0,37	0,39	0,52
Taxa de blastocistos (%)	4,8 (11/229)	8,9 (18/203)	10,7 (20/187)	10,0 (23/229)	12,8 (31/242)	0,51	0,41	0,46

Sala, 2013

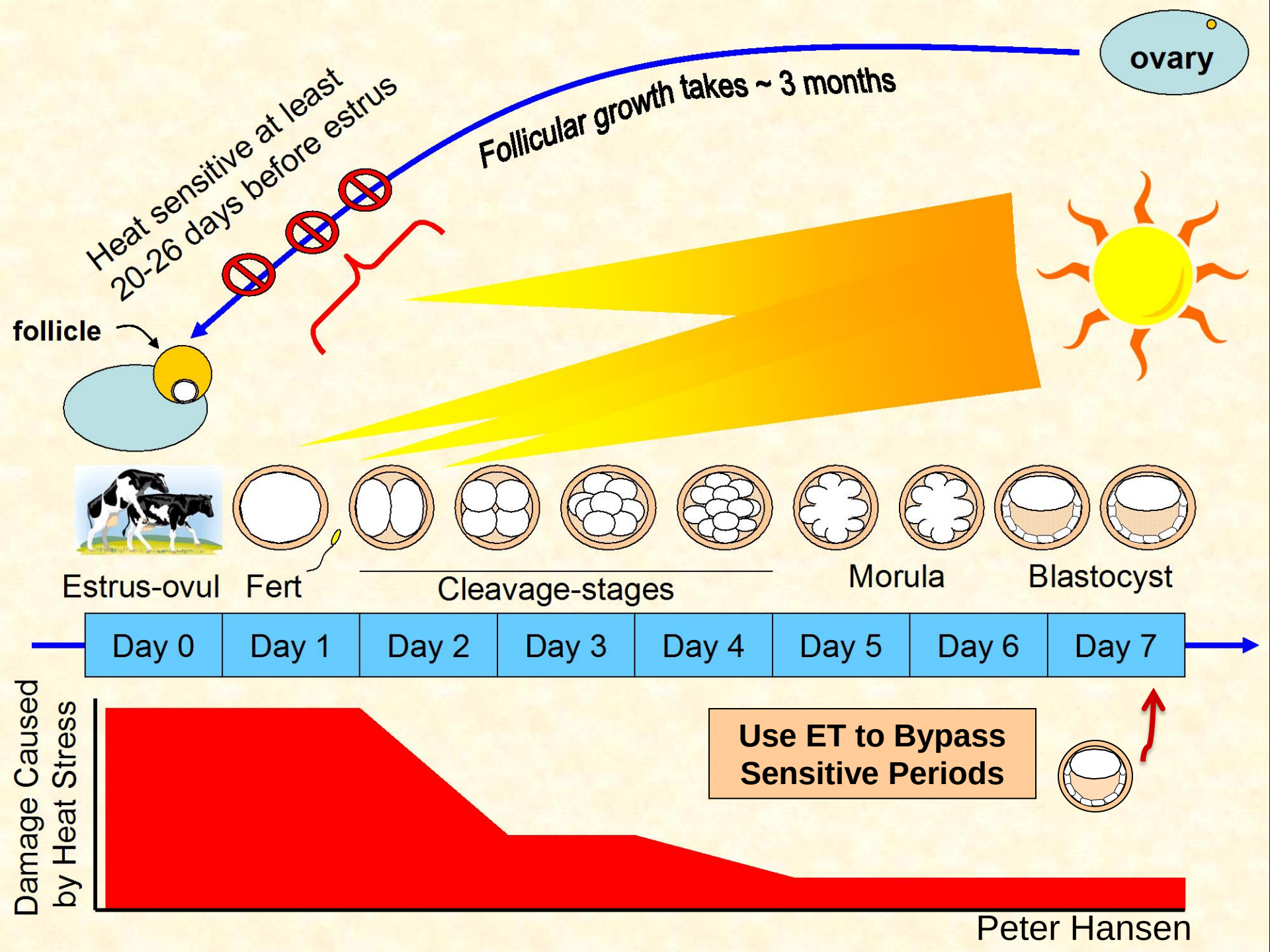
Tecnologia para minimizar o efeito do estresse térmico em vacas de leite

Medidas para minimizar os efeitos deletérios do estresse térmico na reprodução de vacas em lactação

1. Modificações de manejo ambiental
2. Inseminação artificial em tempo fixo
4. Transferência de embriões

Transferência de embriões

1. Eficiência reprodutiva
2. Melhoramento genético


ovary
Follicular growth takes ~ 3 months
Heat sensitive at least
20-26 days before estrus
follicle
Estrus-ovul
Fert
Cleavage-stages
Morula
Blastocyst
Day 0
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7
Damage Caused
by Heat Stress
Use ET to Bypass
Sensitive Periods
Peter Hansen

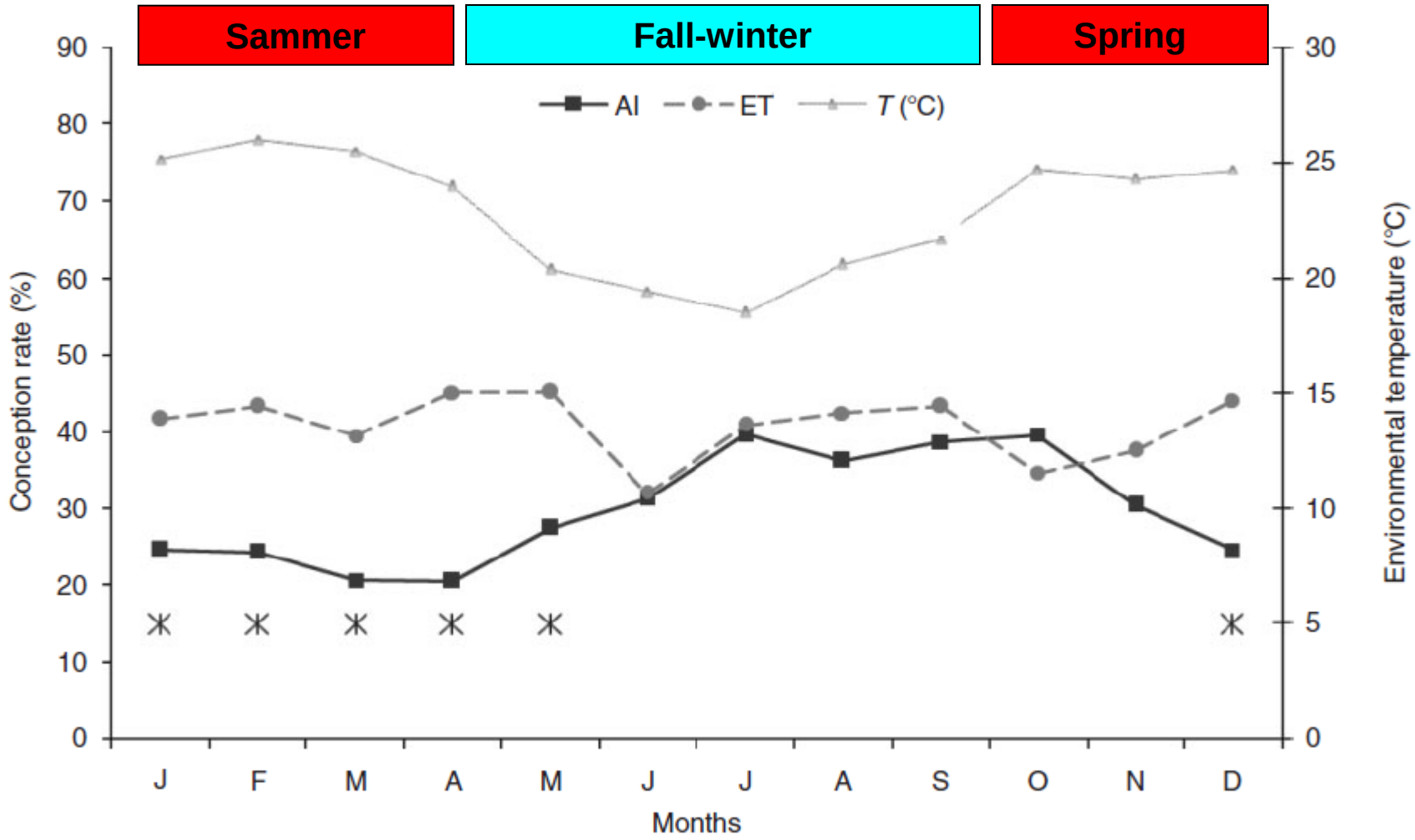
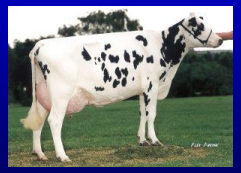


Figure. Conception rates in lactating Holstein cows submitted to AI (n=7501) or embryo transfer (n=2112) throughout the year.



Rodrigues *et al.* (ICAR 2004)

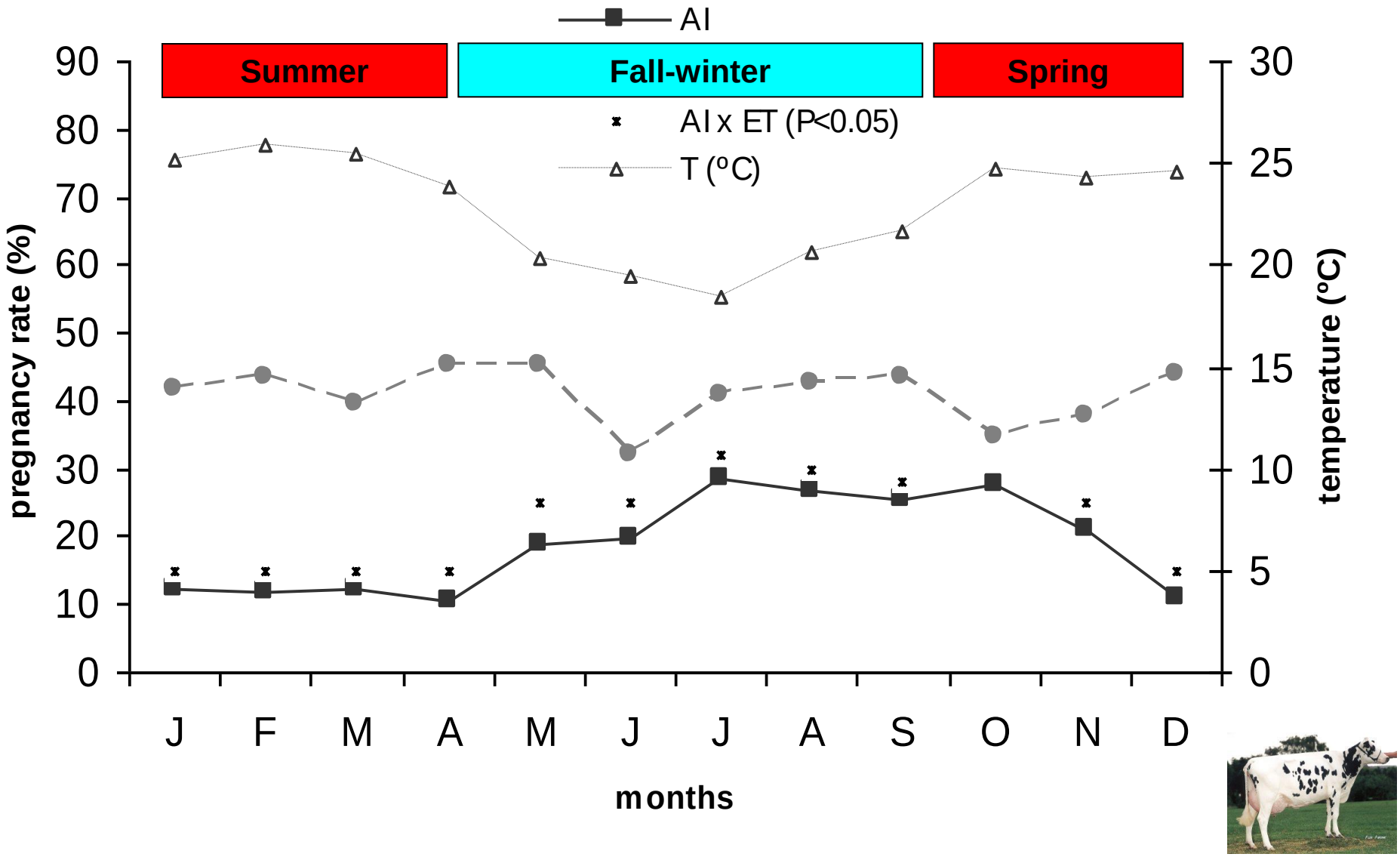
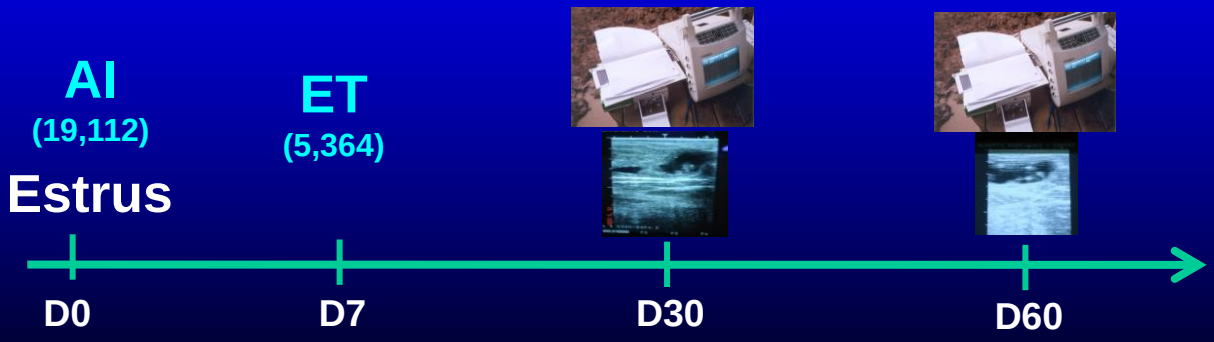


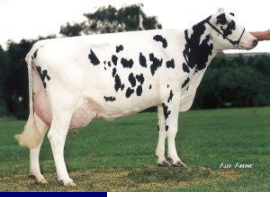
Figure. Conception rates in repeat breeder lactating Holstein cows submitted to AI (n=2803) or embryo transfer (n=2066) throughout the year.

Rodrigues et al., 2004 (SBTE)

Retrospective study

- Lactanting Holstein cows (milk production = 28.4 ± 2.3 kg/day)
- 5,364 *in vivo* embryo produced
- 19,112 artificial insemination
- AI 12 h after estrus detection (farm personal)
- ET 7 days later estrus detection in cow with CL > 16mm (performed by the same technician)





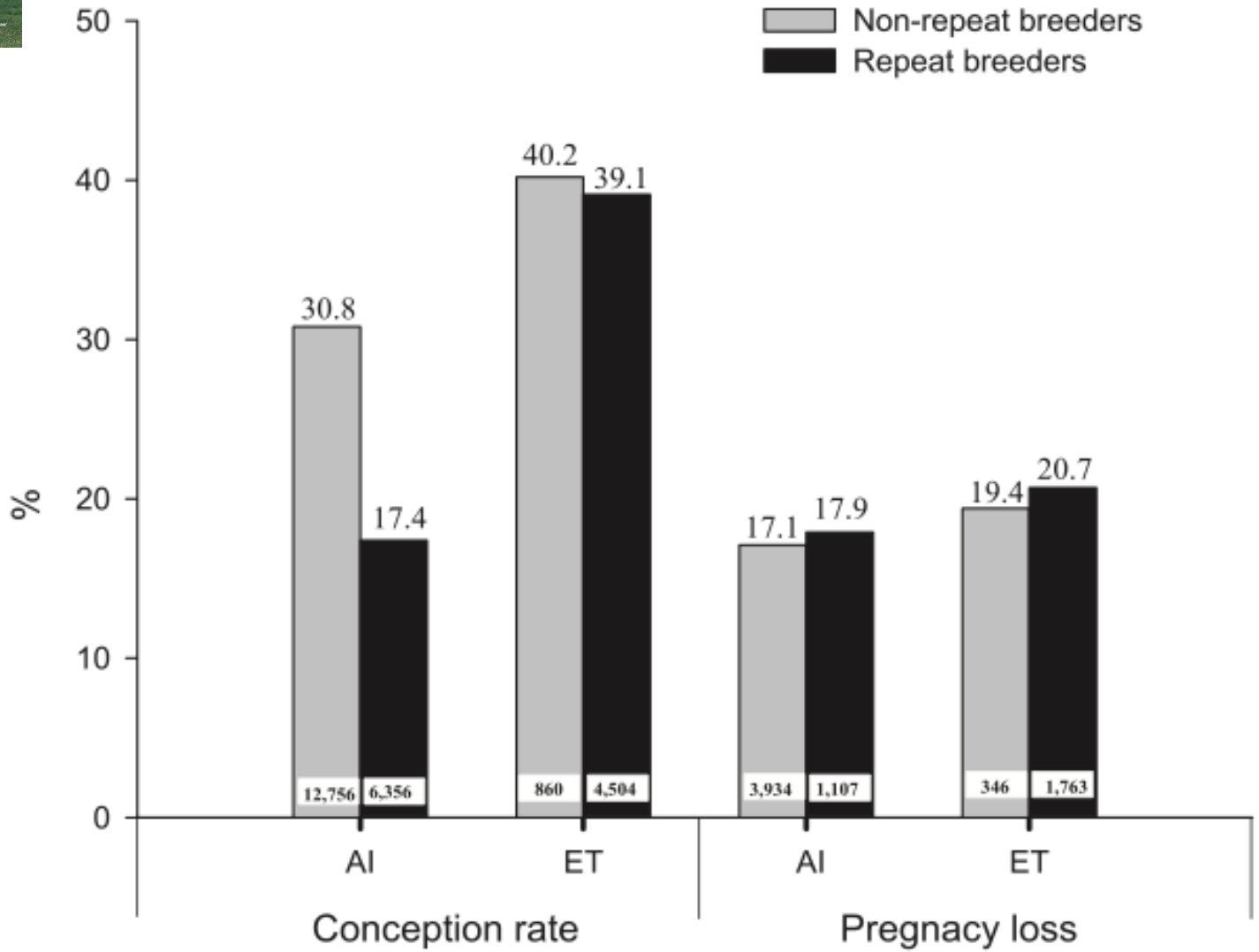
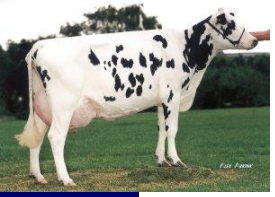


Fig. 5. Conception rate and pregnancy loss of high-producing repeat breeders (≥ 4 services; gray bars) and non-repeat breeder Holstein cows (black bars) submitted to AI (n =19,112) or embryo transfer (ET; n = 5,364). There were effects for breeding technique (AI or ET; P = 0.001), animal category (repeat breeder or non-repeat breeder cows; P = 0.001) and their interaction (P = 0.001) on conception rates. Pregnancy loss was not influenced by the breeding technique (P = 0.08) or animal category (P = 0.39), and there was no interaction (P = 0.87).

Adapted from [48].



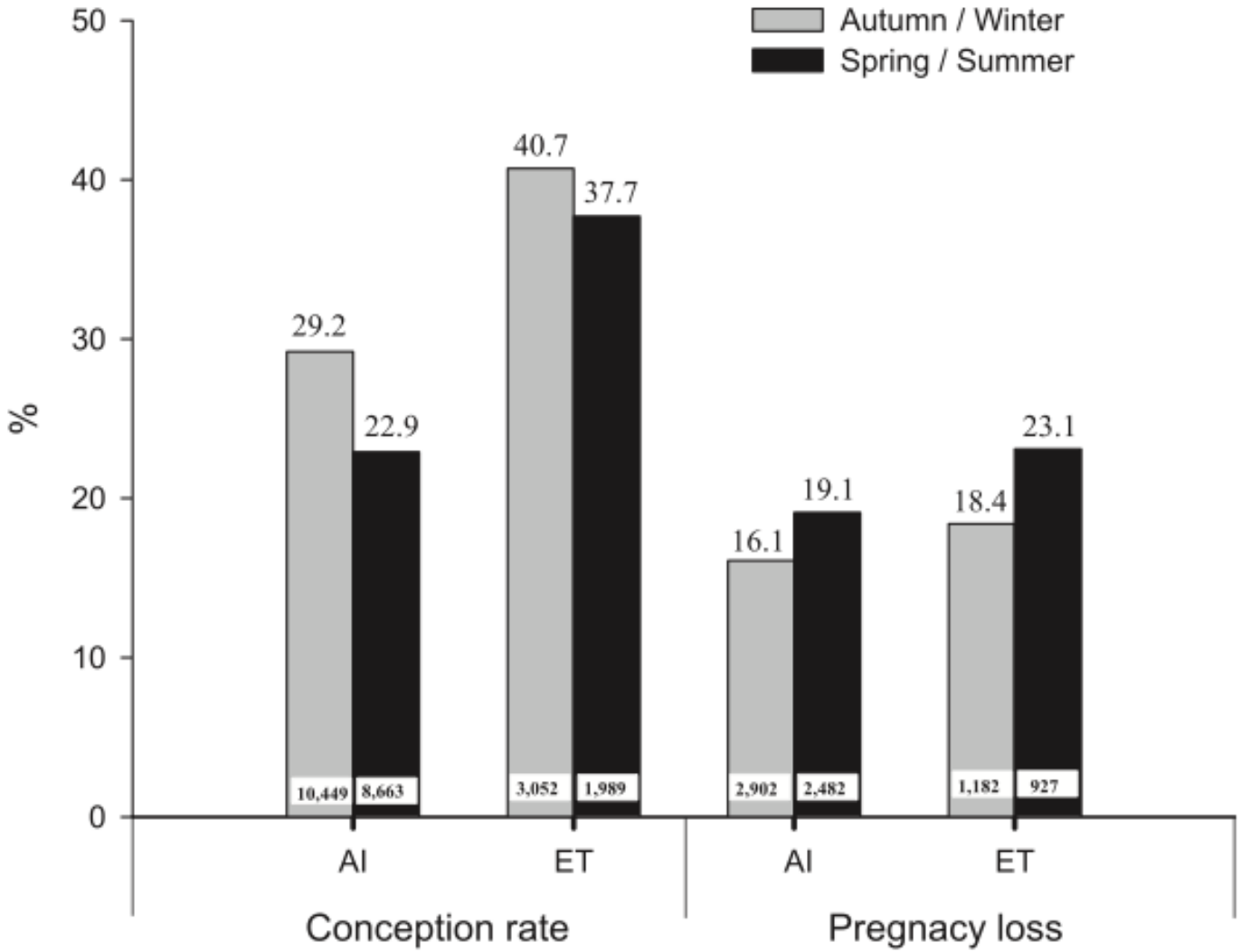


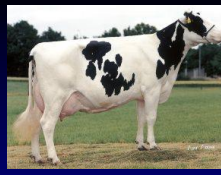
Fig. 4. Conception rate and pregnancy loss (between 30 and 60 d) of high-producing Holstein cows subjected to AI (n = 19,112) or embryo transfer (ET; n = 5,364) during hot (gray bars) and cool (black bars) seasons. There were differences for breeding technique (AI versus ET; P = 0.001), season (hot versus cool; P = 0.001) and an interaction of breeding technique and season (P = 0.003) on the conception rates. Pregnancy loss was influenced by breeding technique (P = 0.001) and season (P = 0.001), but there was no interaction (P = 0.55).

Adapted from [48].

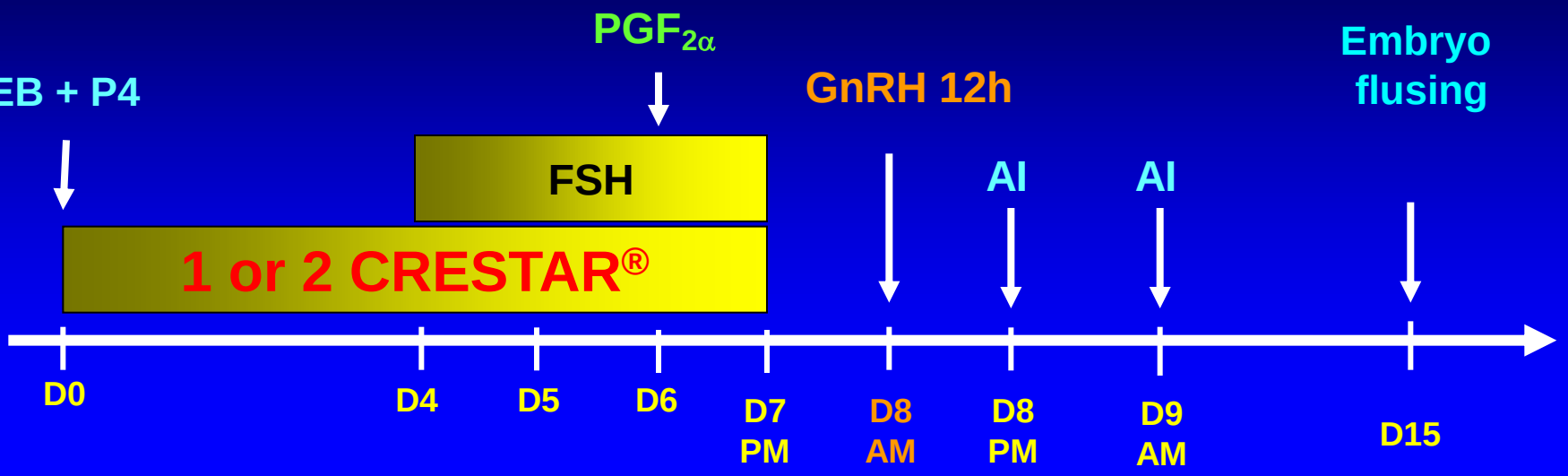
Fatores limitantes para introduzir um programa de TE em vacas de leite

1. Produção de embriões em larga escala

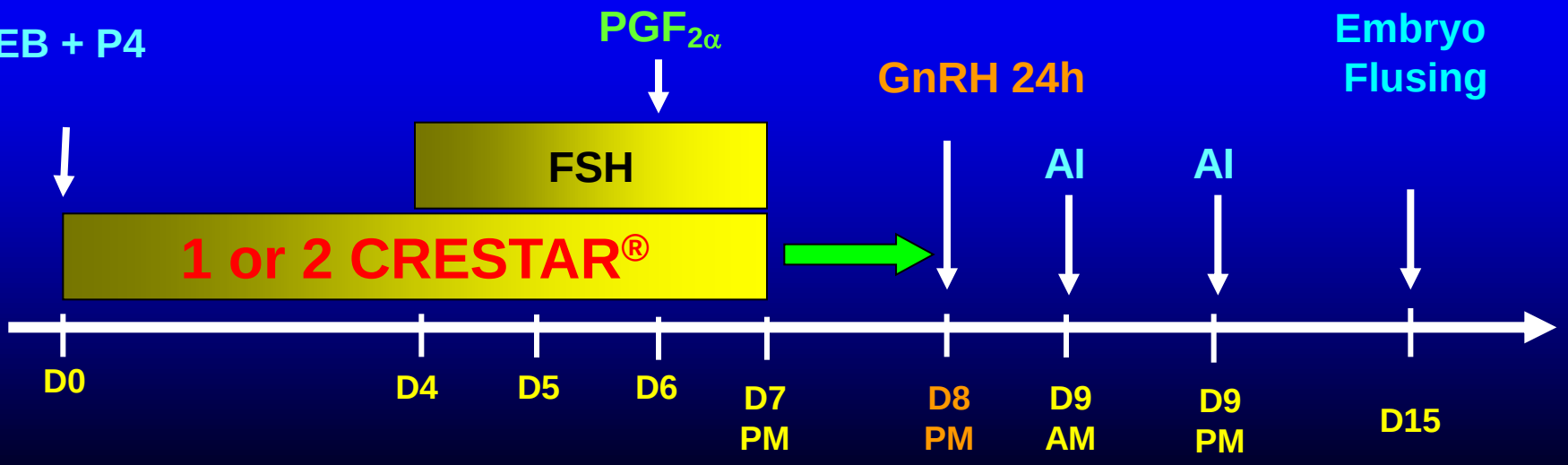
1. Eficiência da receptora de embriões

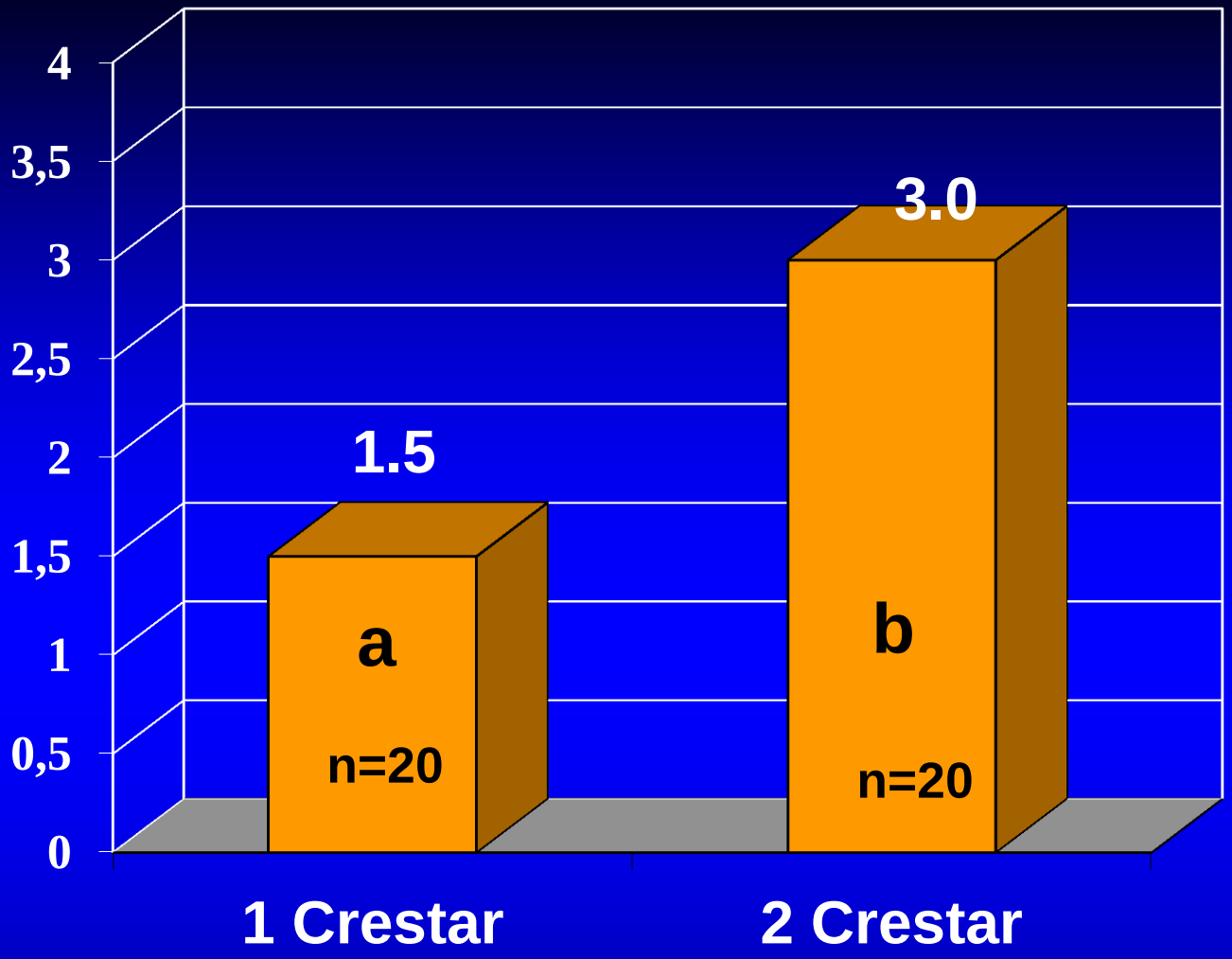


Group 1 (n=20)



Group 2 (n=20)



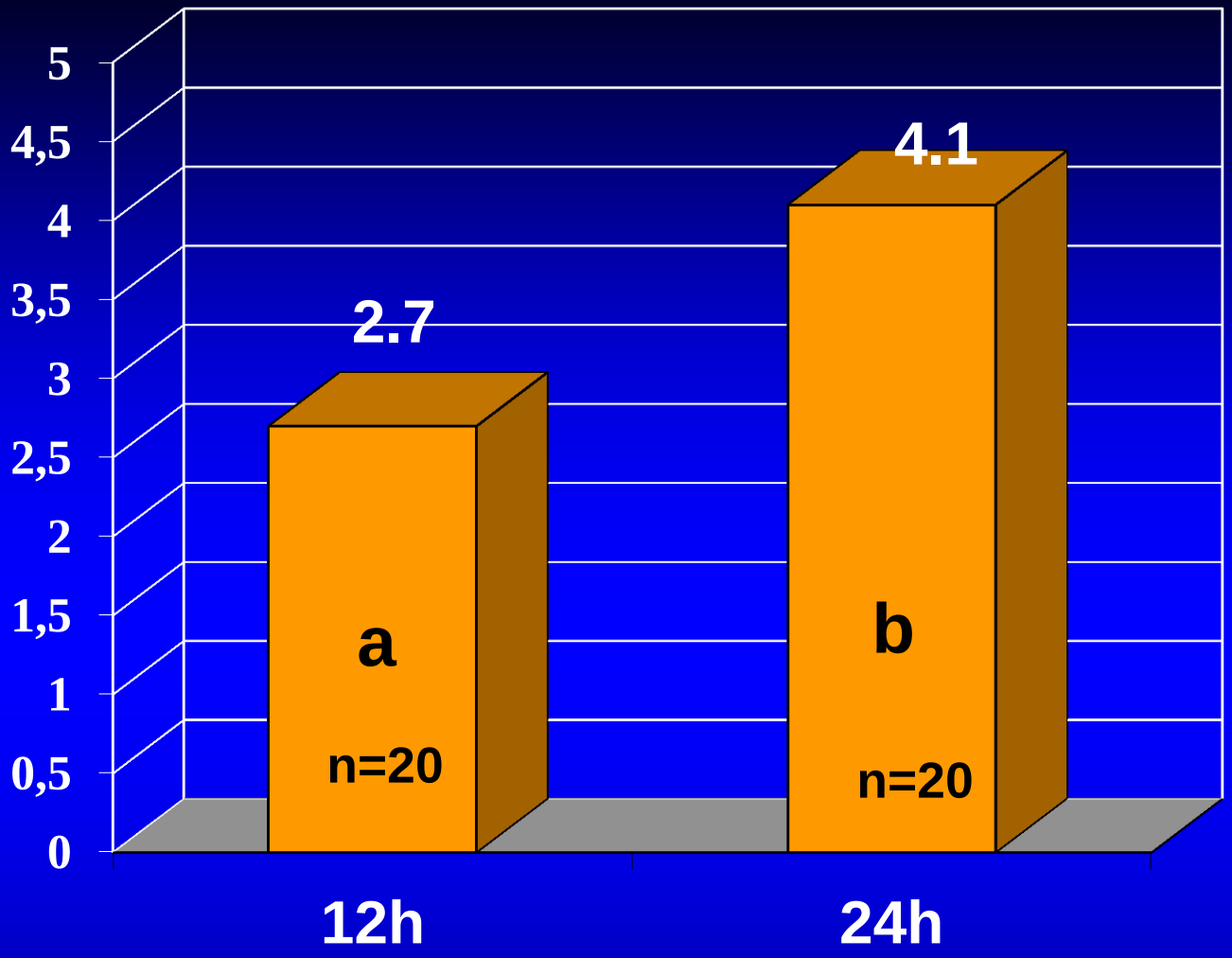


P < 0.05

Transferable embryos

Figure. Transferable embryo following FTAI when cow received one or two norgestomet implants during FSH treatment.

Rodrigues et al., 2004 (SBTE)



P < 0.05

Transferable embryos

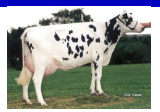
Figure. Transferable embryo following FTAI when cow received GnRH 12 or 24h after the last FSH treatment.

Rodrigues et al., 2004 (SBTE)

Influence of breed on the efficiency of OPU programmes

X

Table 1. Effect of donor (heifer) genetic group [*Bos indicus* (Nelore) and *Bos taurus* (Holstein)] on oocyte recovery rate and oocytes competence to develop into blastocysts *in vitro*.



	Genetic Group	
	Nelore (n = 9)	Holstein (n = 9)
Number of Replicates	6	6
OOCYTE RECOVERY AND QUALITY		
Visualized follicles	41.0 ± 2.1[a]	22.1 ± 1.3[b]
Total oocytes	37.1 ± 2.6[a]	15.4 ± 1.2[b]
Recovery rate (%)	90.5[a]	69.7[b]
Oocytes submitted to IVC	25.6 ± 1.8[a]	9.1 ± 0.9[b]
DEVELOPMENTAL COMPETENCE		
Cleaved structures	21.1 ± 1.6[a]	5.2 ± 0.5[b]
Cleavage rate (%)	82.4[a]	57.1[b]
Blastocysts 7 d after IVF	7.3 ± 0.9[a]	1.1 ± 0.2[b]
Blastocyst rate (%)	28.5[a]	12.1[b]

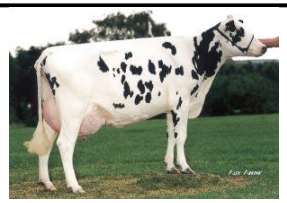
[a,b]$P < 0.05$.

Adapted from Gimenes (2010)

Table 2. Effect of donor (non-lactating cows) genetic group [*Bos indicus* (Gir) and *Bos taurus* (Holstein)] on oocyte recovery rate and quality.

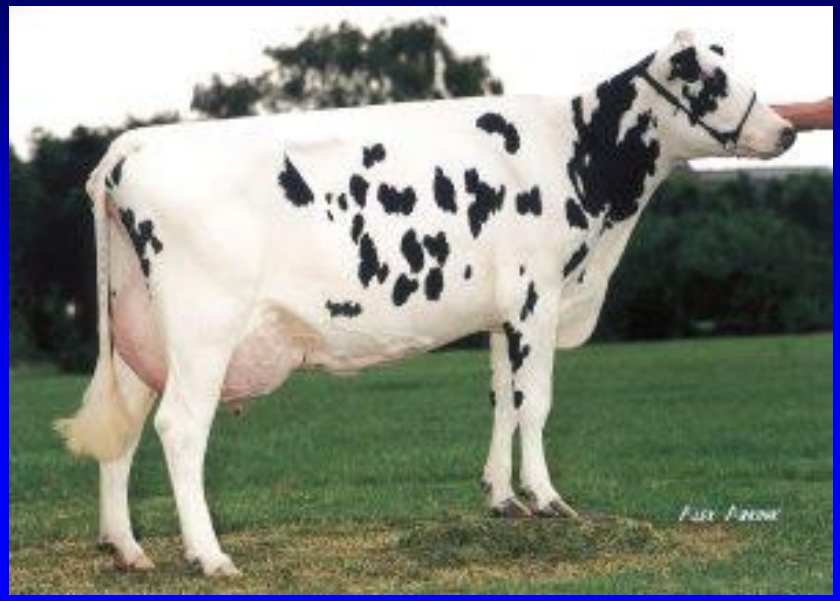
	Genetic Group	
	Gir (n = 14)	Holstein (n = 14)
Number of Replicates	8	8
Visualized follicles	25.5 ± 1.2	23.8 ± 1.1
Total oocytes	23.4 ± 1.6[a]	14.9 ± 0.9[b]
Recovery rate (%)	91.2[a] (2604/2856)	61.1[b] (1633/2673)
OOCYTE QUALITY		
Grade 1	5.3 ± 0.5[a]	1.6 ± 0.2[b]
Grade 2	9.8 ± 0.7[a]	5.2 ± 0.4[b]
Grade 3	4.8 ± 0.5	4.3 ± 0.4
Grade 4	0.9 ± 0.2	1.0 ± 0.2
Apoptosis by TUNEL (%)	16.6[b] (21/117)	40.6[a] (34/82)

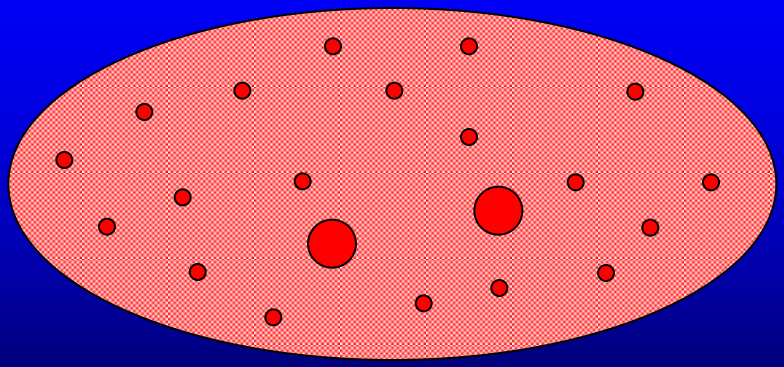
[a,b]$P < 0.05$.



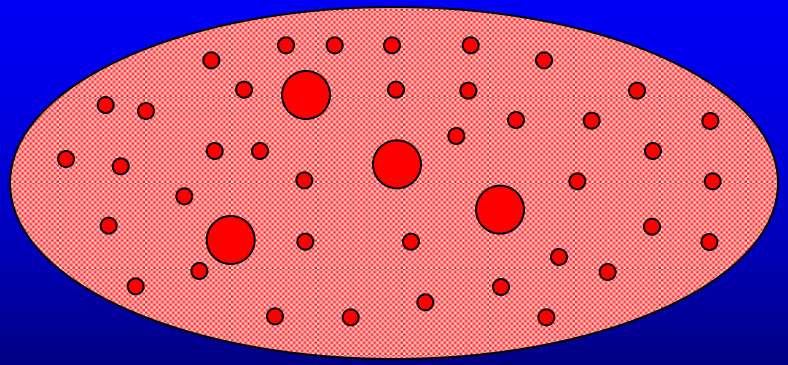
Adapted from Sales (2011)

Quantity and quality of follicles in *Bos taurus* and *Bos indicus*



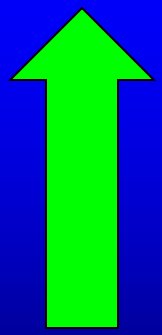


Ovary



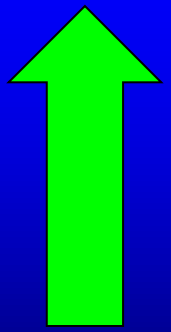
Ovary

É possível selecionar doadoras pela população folicular?



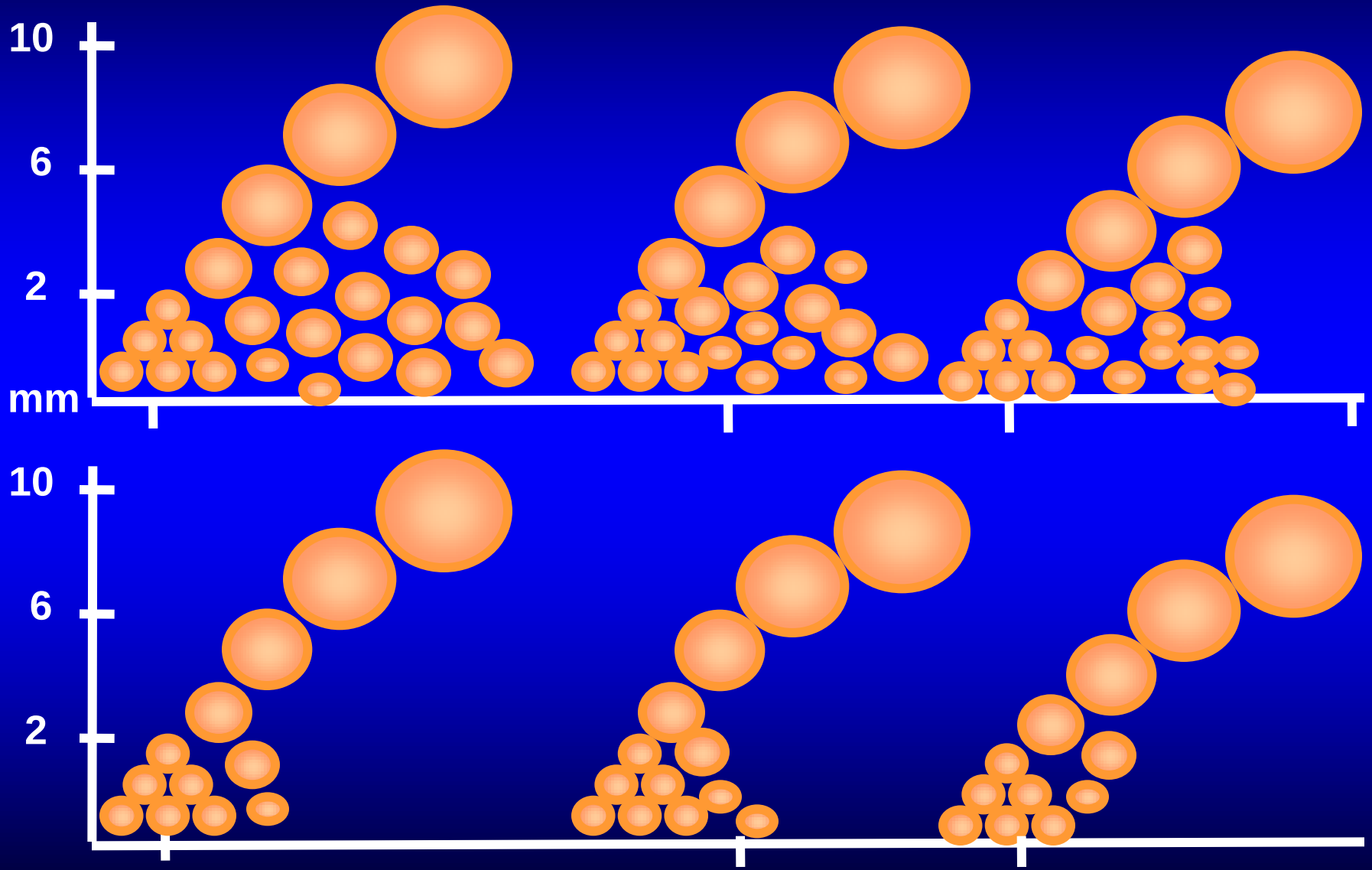
Quantidades de folículos

=



Produção de embriões (SOV e OPU/FIV)

Alta repetibilidade no recrutamento de folículos em cada onda folicular em bovinos



(BONI *et al*., 1997)

RESULTADOS AMH

“Correlação entre a população folicular ovariana e concentração de AMH em novilhas da raça Nelore e Holandesa submetidas ao mesmo protocolo hormonal”

VS

Pós-graduanda: Emiliana de O. S. Batista
Orientador: Prof. Pietro Sampaio Baruselli

Genese
diagnósticos & life science
o ponto de partida dos seus resultados

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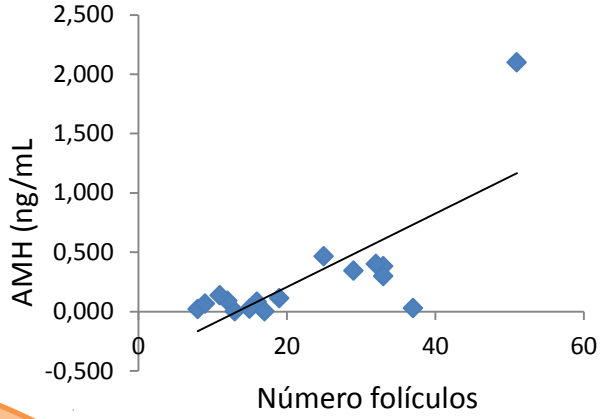
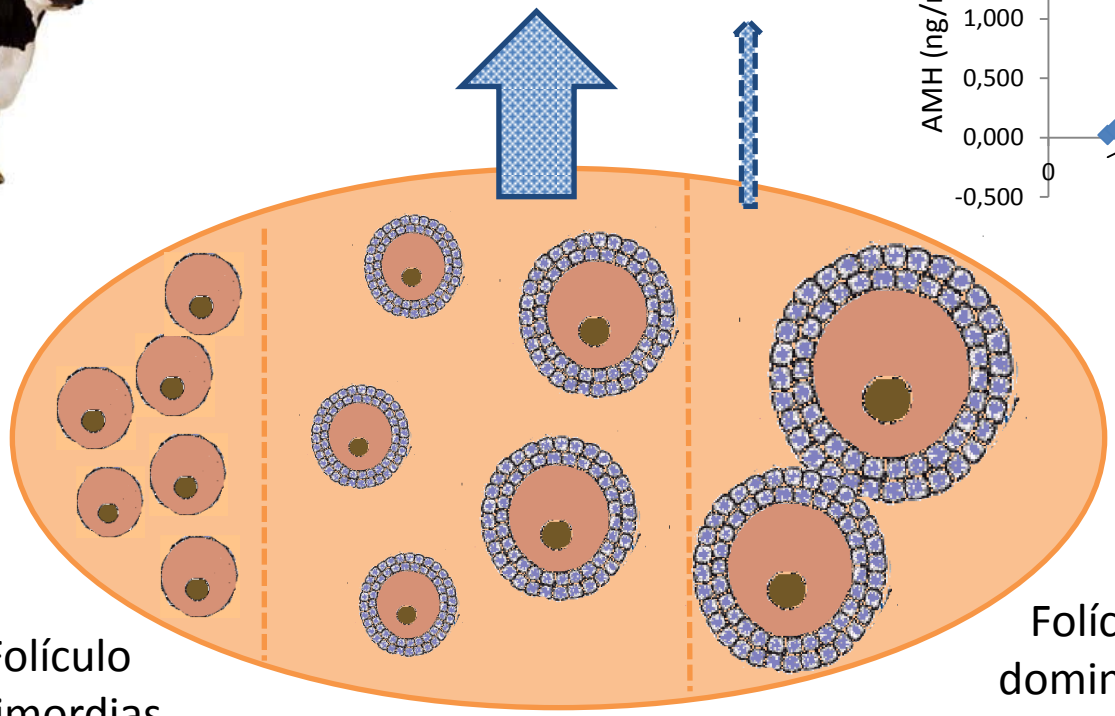
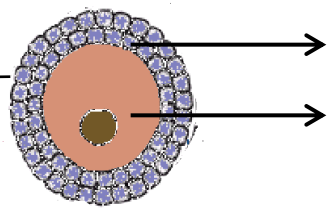
MODELO HIPOTÉTICO - HOLANDESA

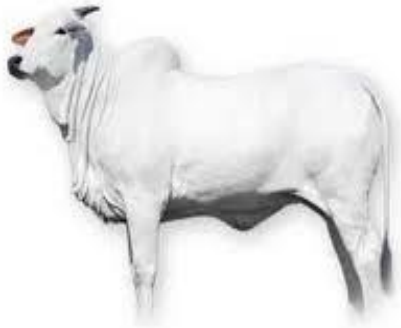


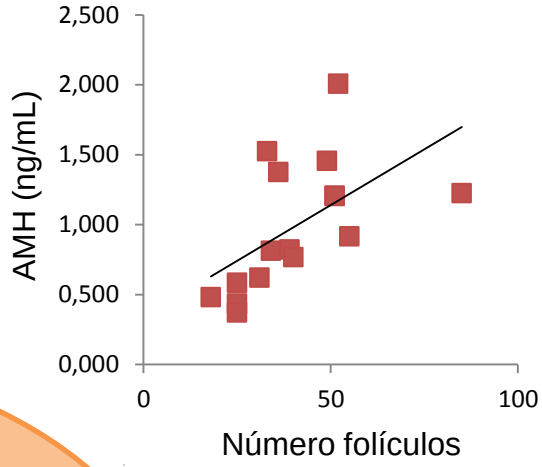


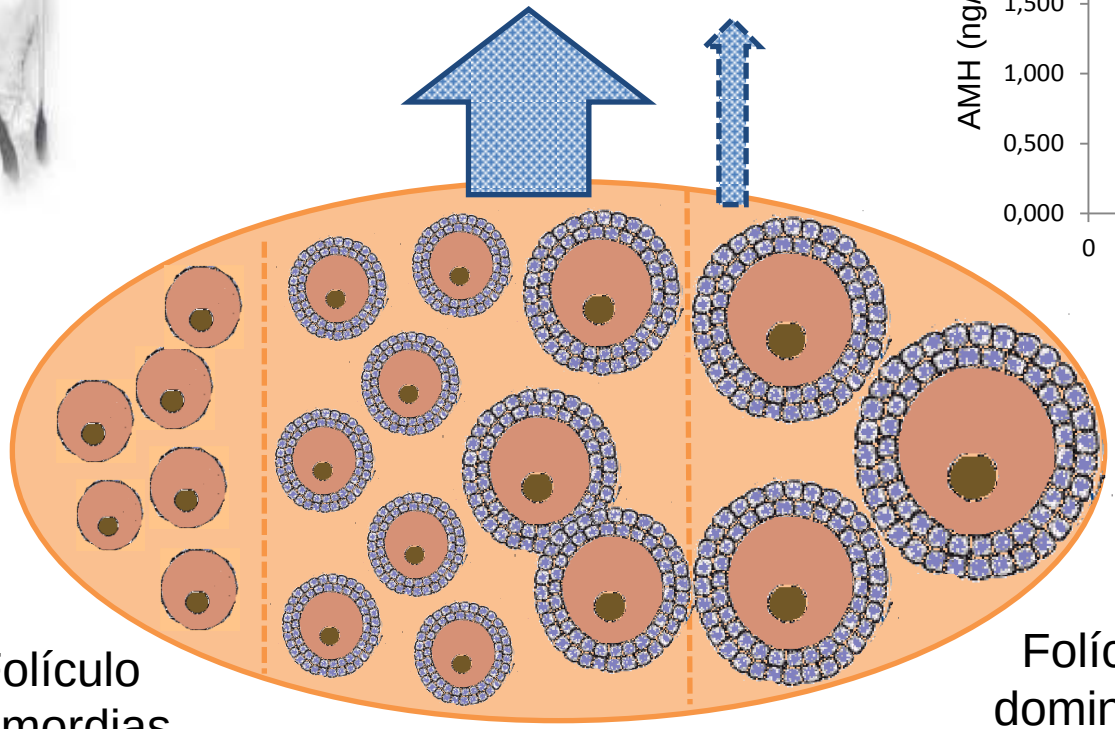


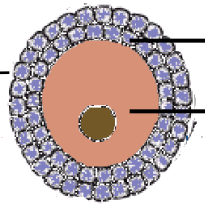
Adaptado de Rico et al., 2011

MODELO HIPOTÉTICO - NELORE



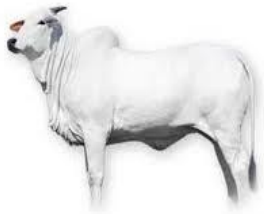






Adaptado de Rico et al., 2011

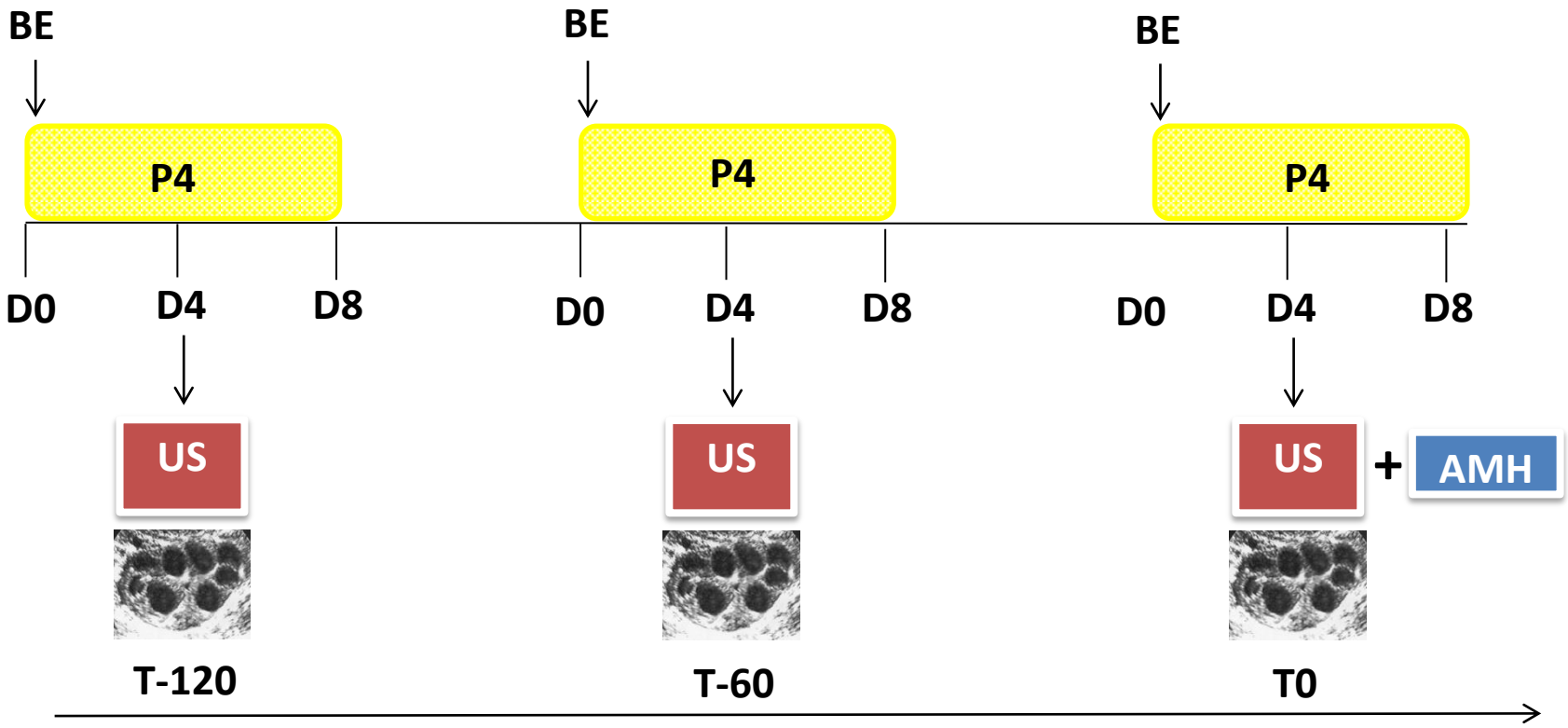
MATERIAL E MÉTODOS



Bos indicus
N=16

VS

Bos taurus
N=16



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POPULAÇÃO FOLICULAR

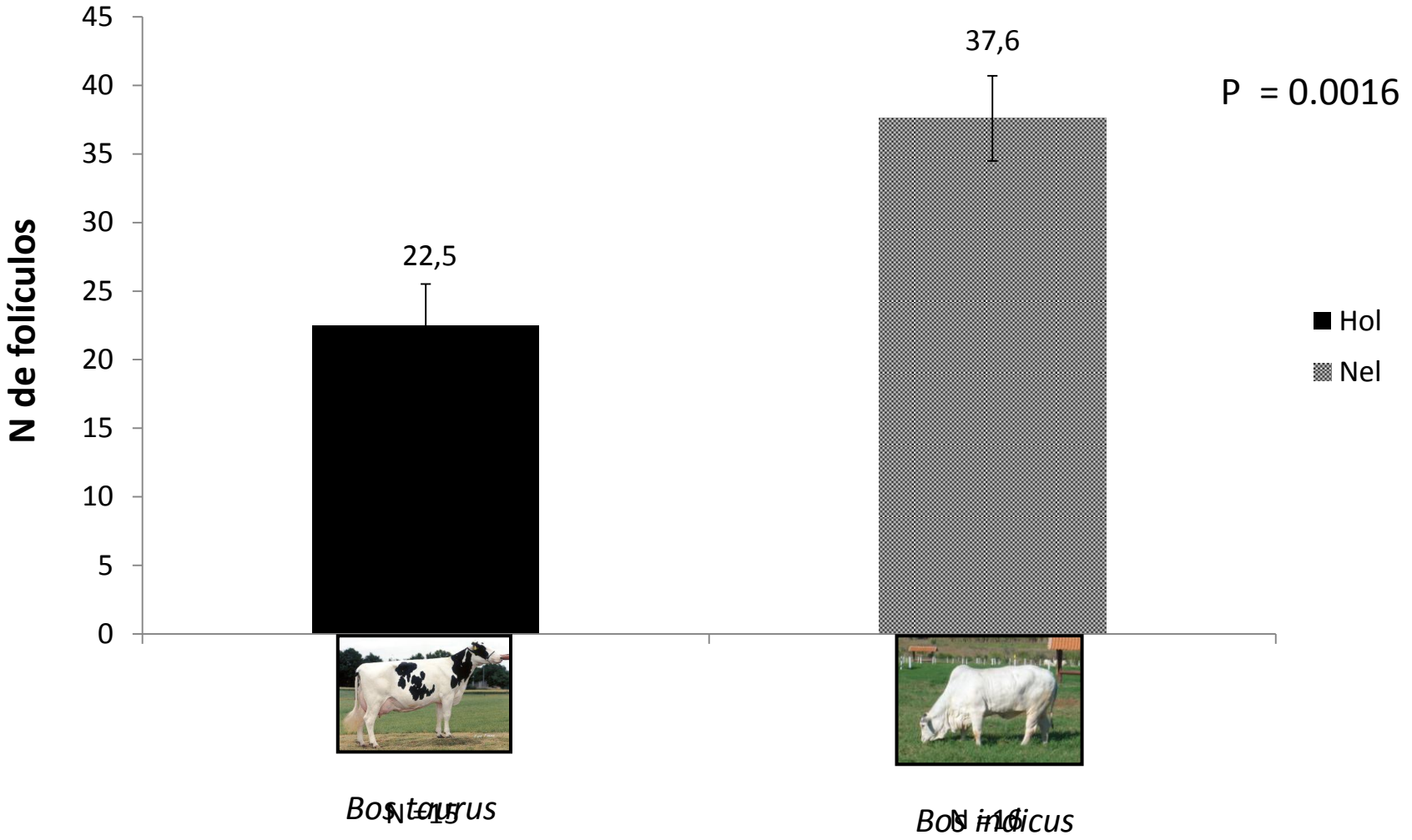

Figura 1. População folicular no dia 4 do protocolo hormonal em novilhas Nelore e Holandesas submetidas ao mesmo protocolo. Dados apresentados como média ± EPM.

Emiliana de O. S. Batista

CONCENTRAÇÃO DE AMH

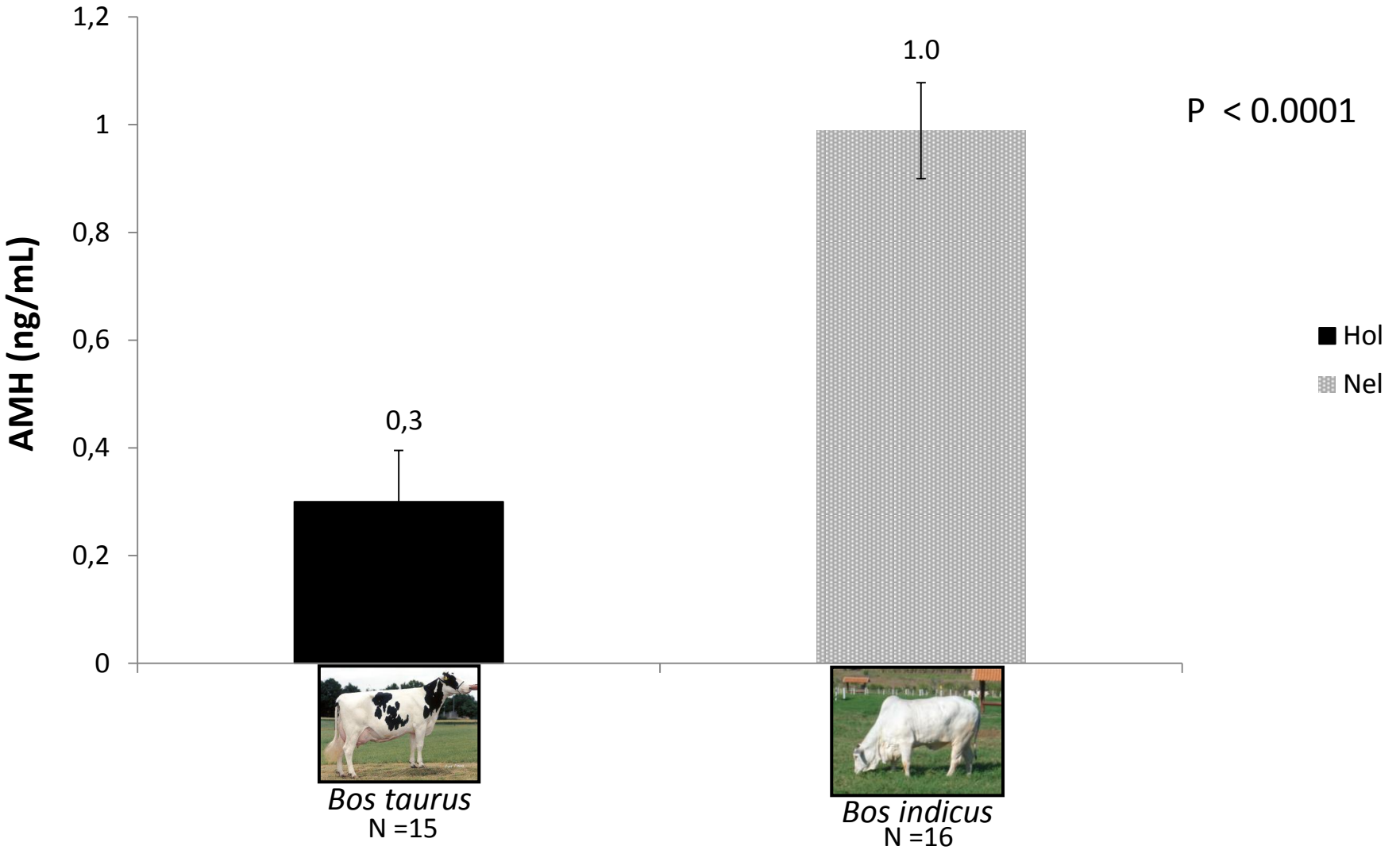

Figura 2. Concentração de AMH (ng/mL) no dia 4 do protocolo hormonal em novilhas Nelore e Holandesas submetidas ao mesmo protocolo. Dados apresentados como média ± EPM.

Emiliana de O. S. Batista

AMH X POPULAÇÃO FOLICULAR

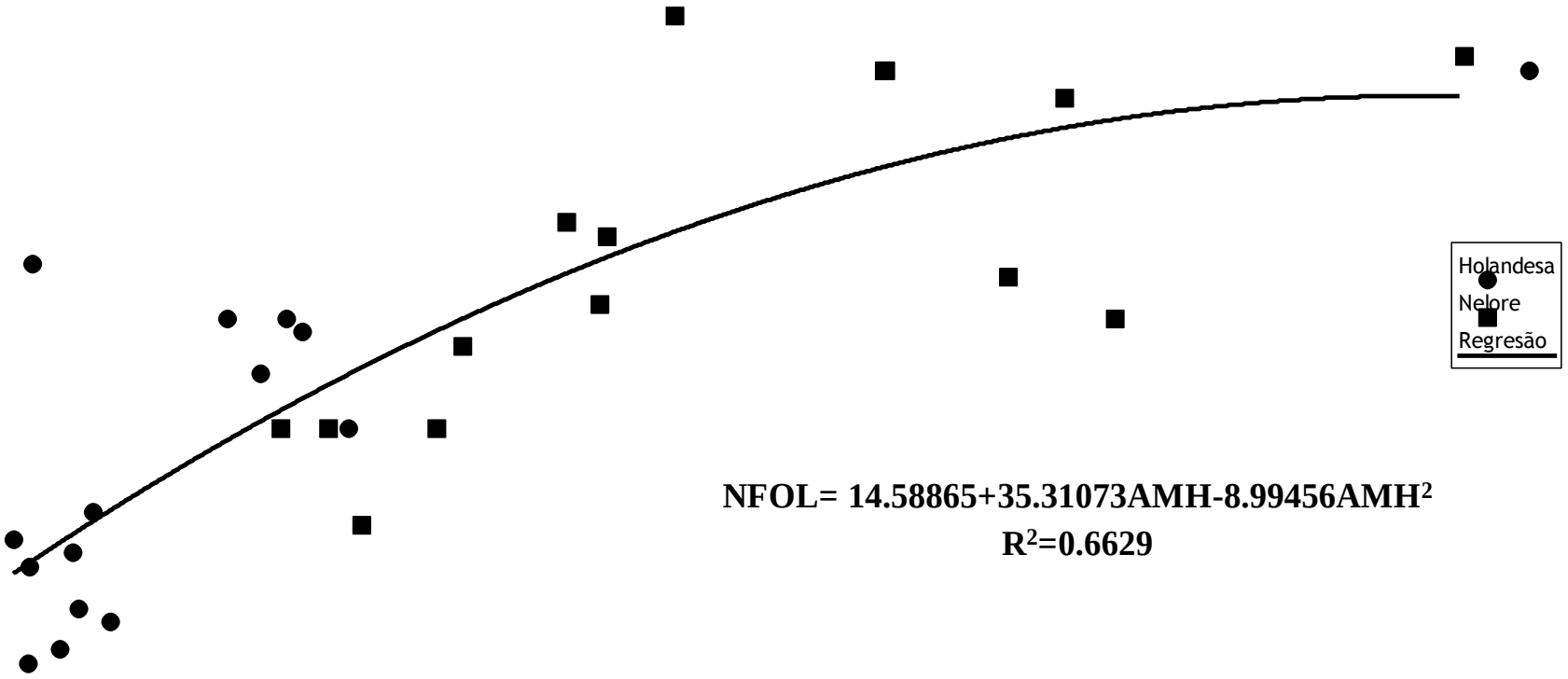

Figura 3. Relação positiva entre a concentração de AMH medida no T0 e o total de folículos antrais avaliados no dia da emergência da onda folicular de novilhas Nelore e Holandesas. Representação em quadrados (novilhas Nelore), círculos (novilhas Holandesas).

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AMH X POPULAÇÃO FOLICULAR - HOLANDESA

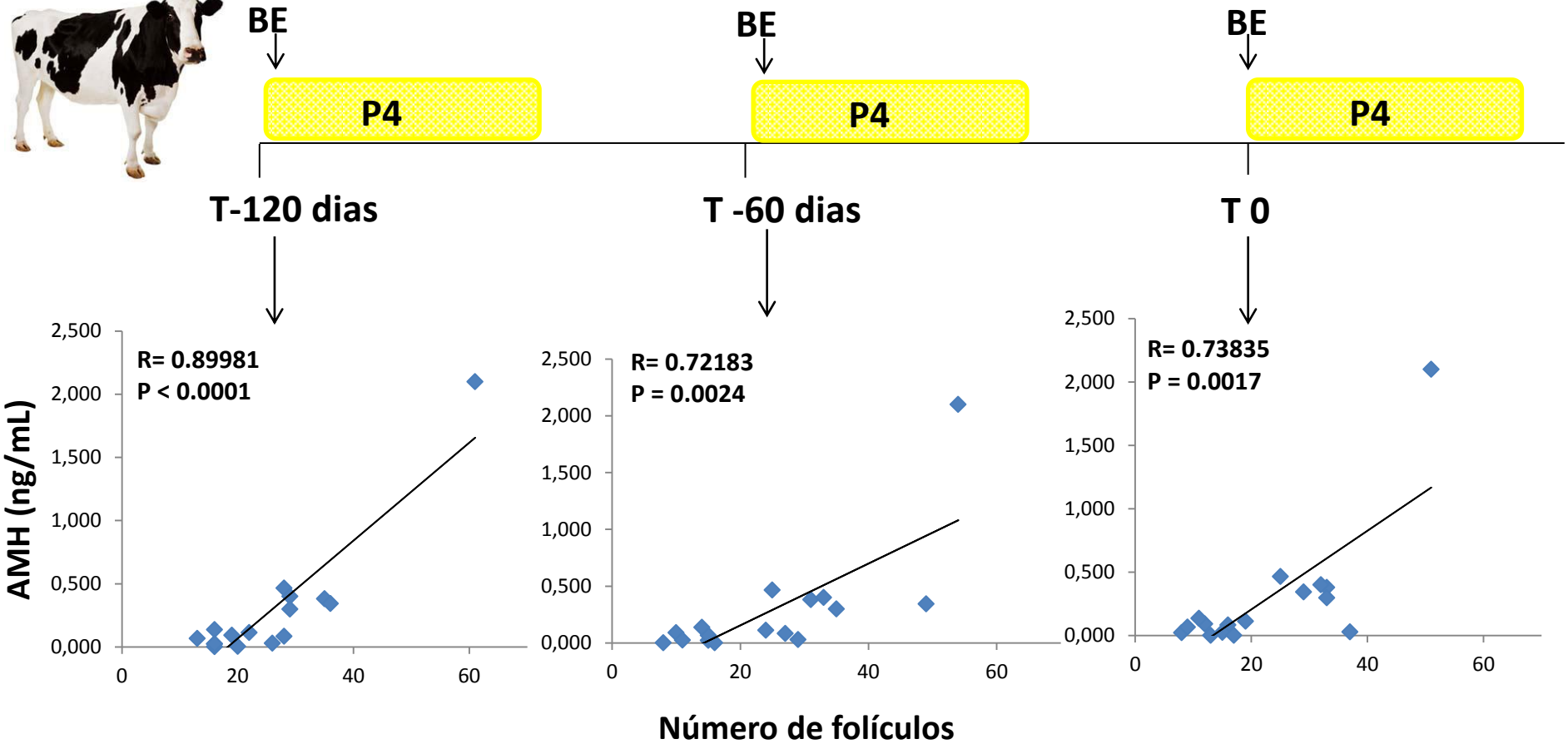

Figura 5. Correlação positiva entre o número total de folículos antrais no T0, T-60, T-120 e a concentração de AMH (T0) de novilhas Holandesas (n=15) avaliados no dia 4 do protocolo hormonal.

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AMH X POPULAÇÃO FOLICULAR - NELORE

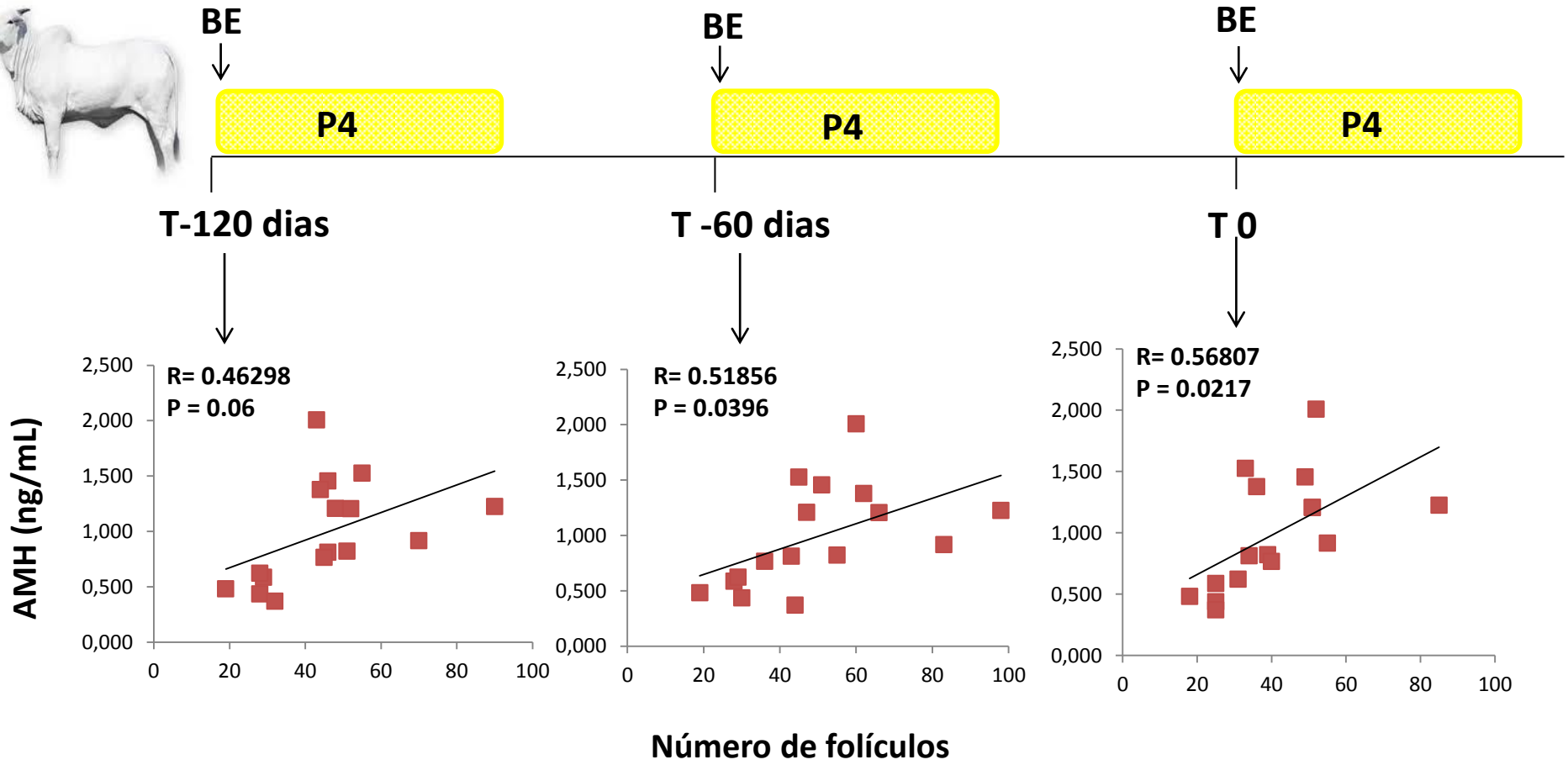

Figura 4. Correlação positiva entre o número total de folículos antrais no T0, T-60, T-120 e a concentração de AMH (T0) de novilhas Holandesas (n=15) avaliados no dia 4 do protocolo hormonal.

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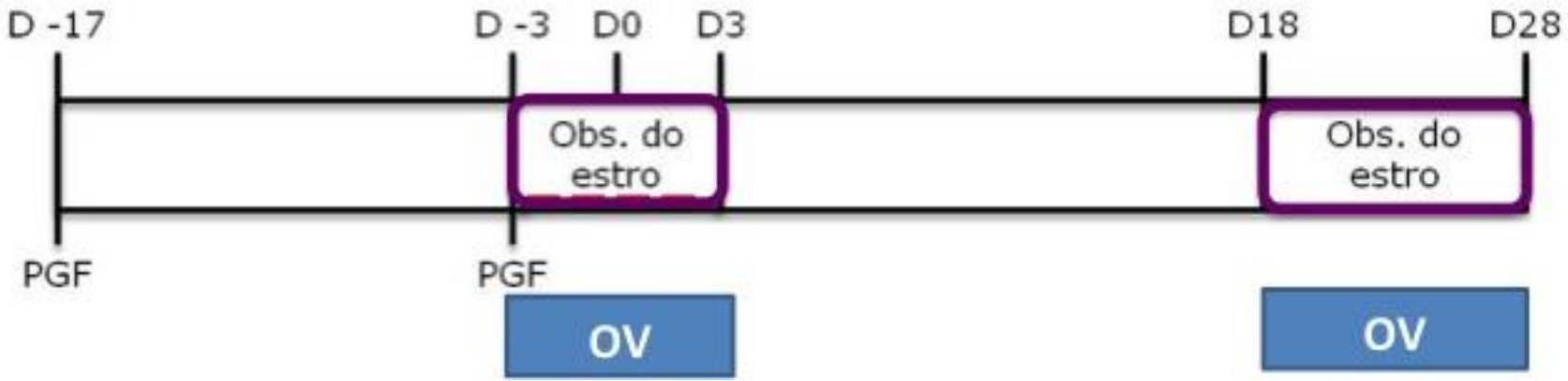
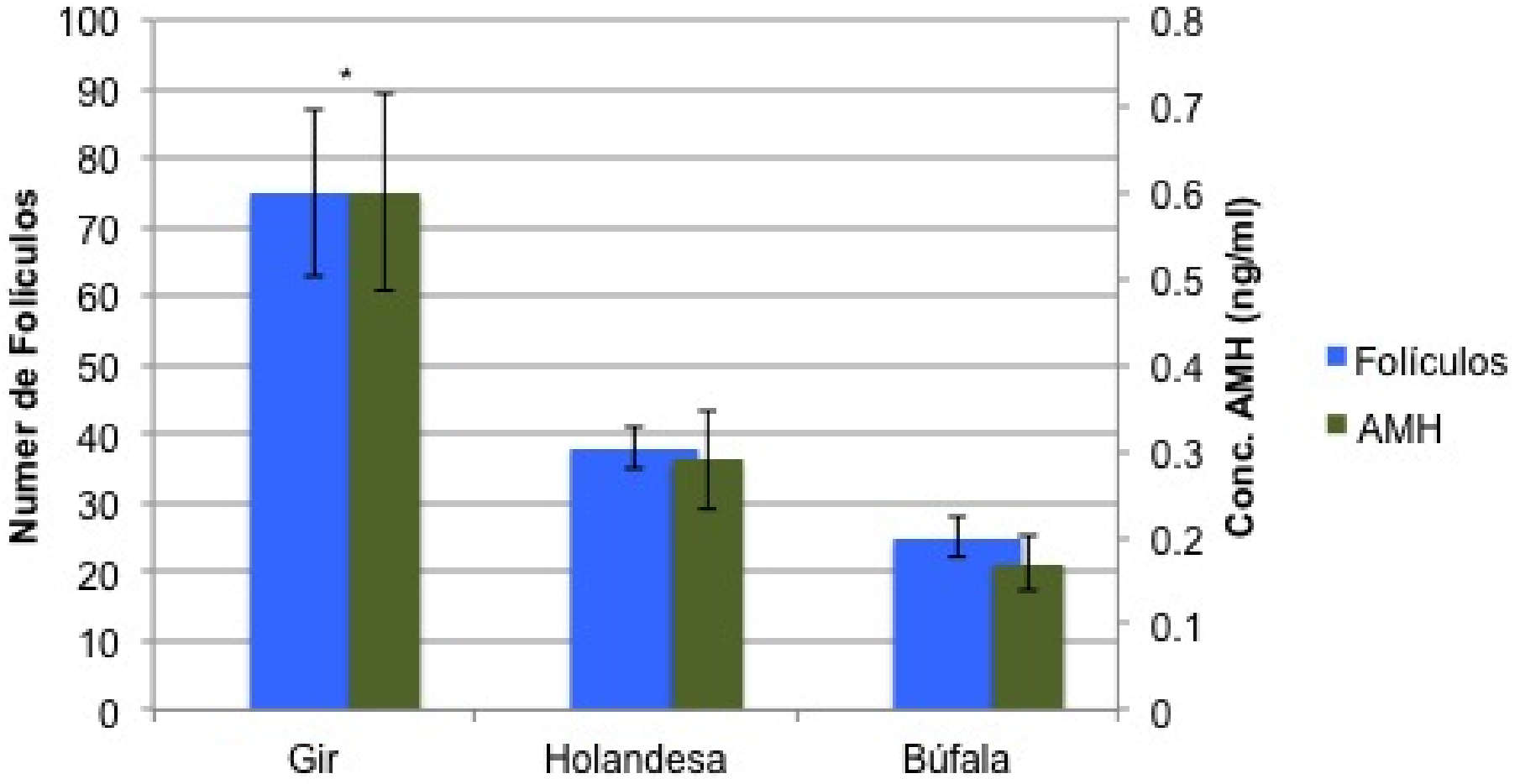


coleta de sangue para dosagem de AMH

+

contagem de folículos < 5 mm presentes no ovário

Júlia Baldrighi



Concentração de AMH plasmático e Número de folículos presentes no dia da ovulação em novilhas Gir, Holandesa e Búfala, mantidas nas mesmas condições nutricionais

Júlia Baldrighi

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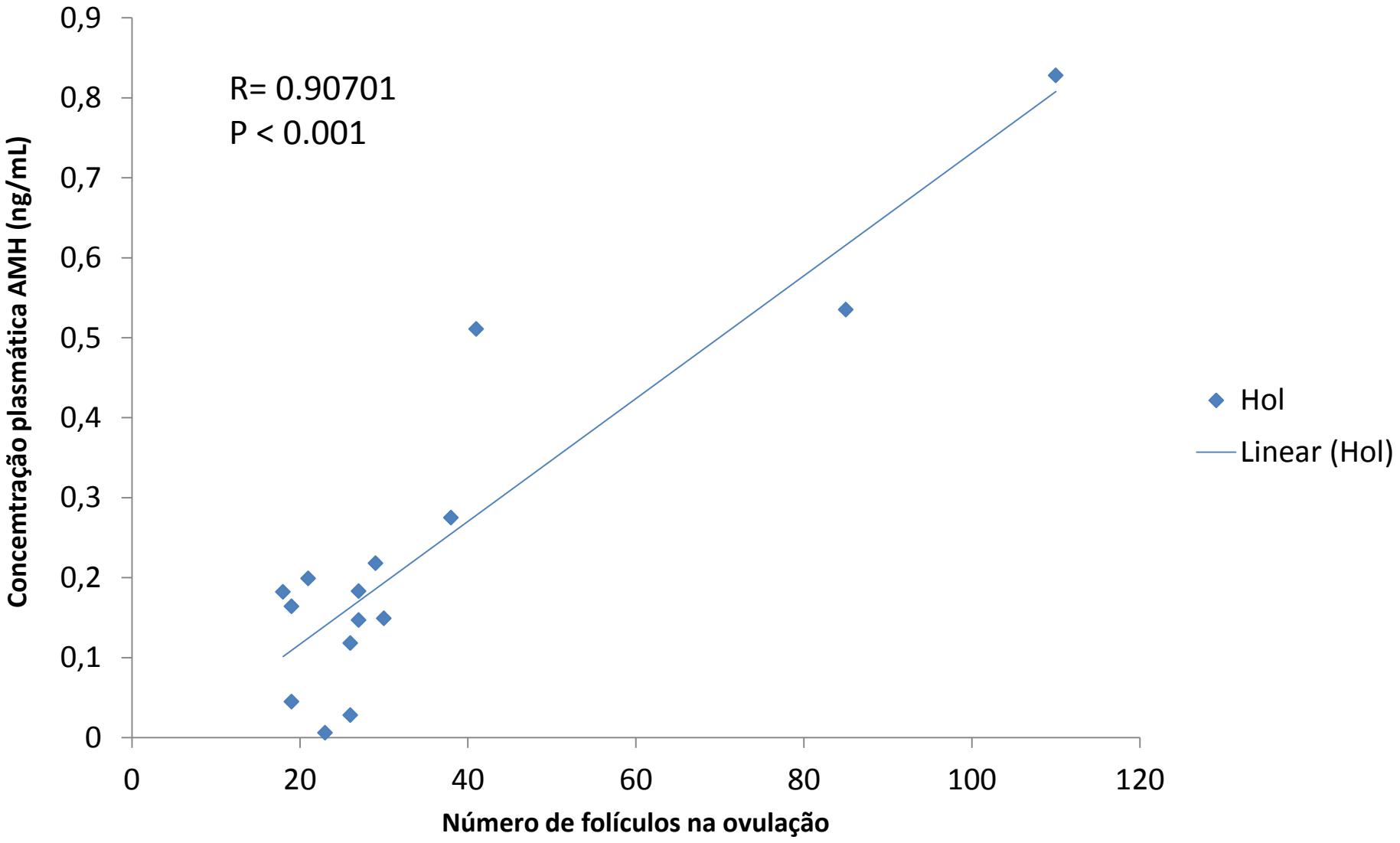
Holandesa - Correlação concentração AMH e número de folículos



Júlia Baldrighi

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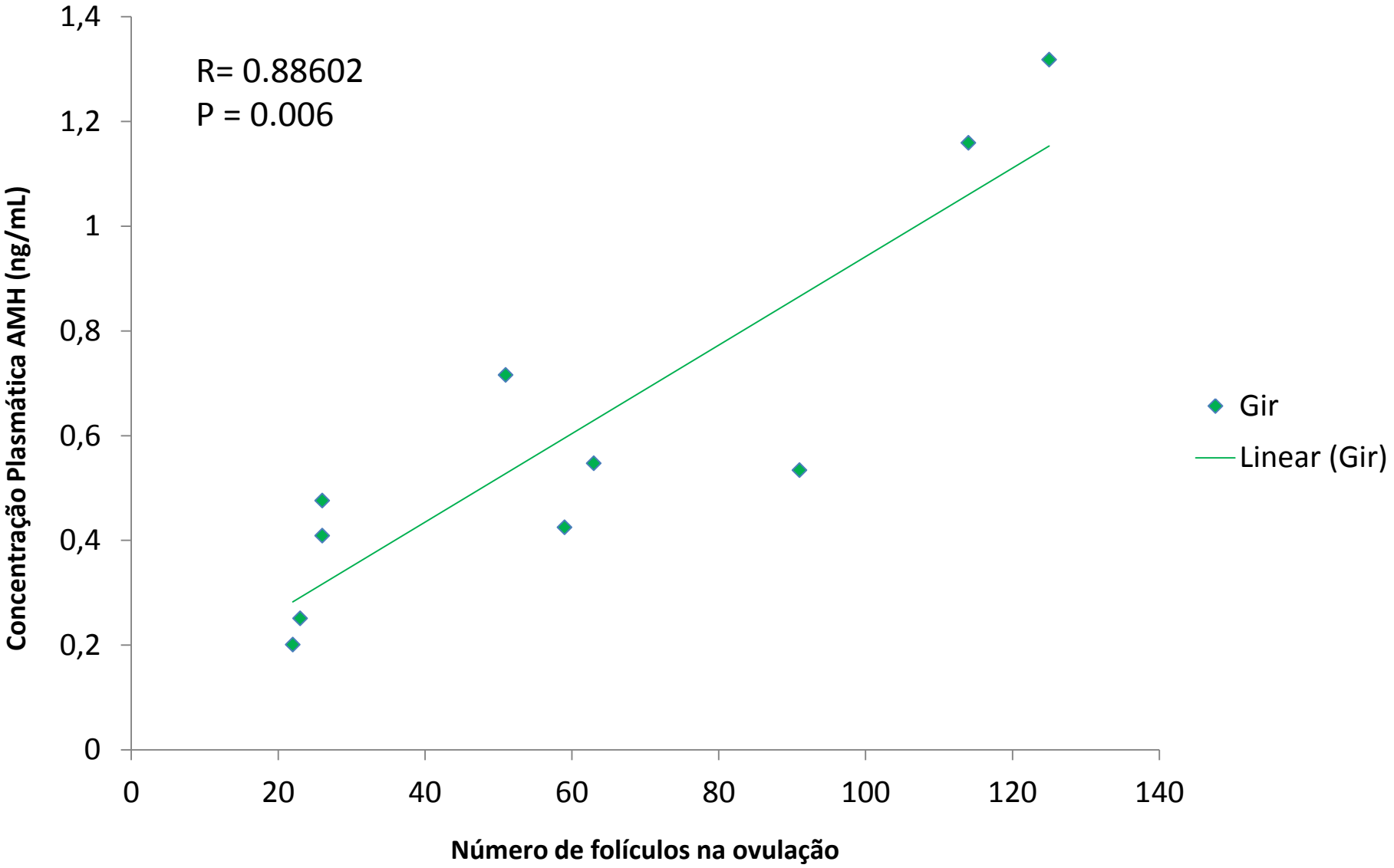
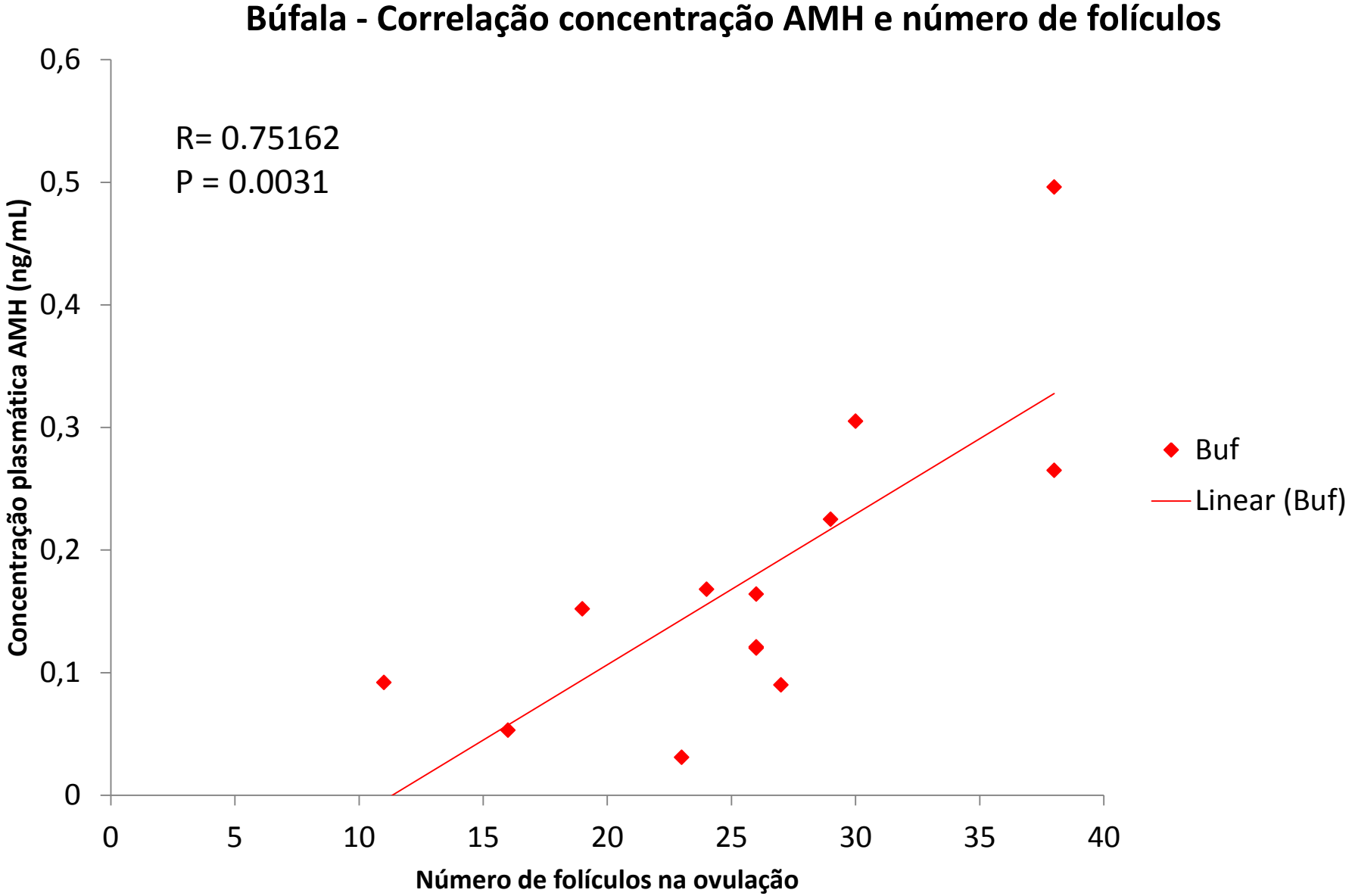
Gir - Correlação concentração de AMH e número de folículos



Júlia Baldrighi



Júlia Baldrighi

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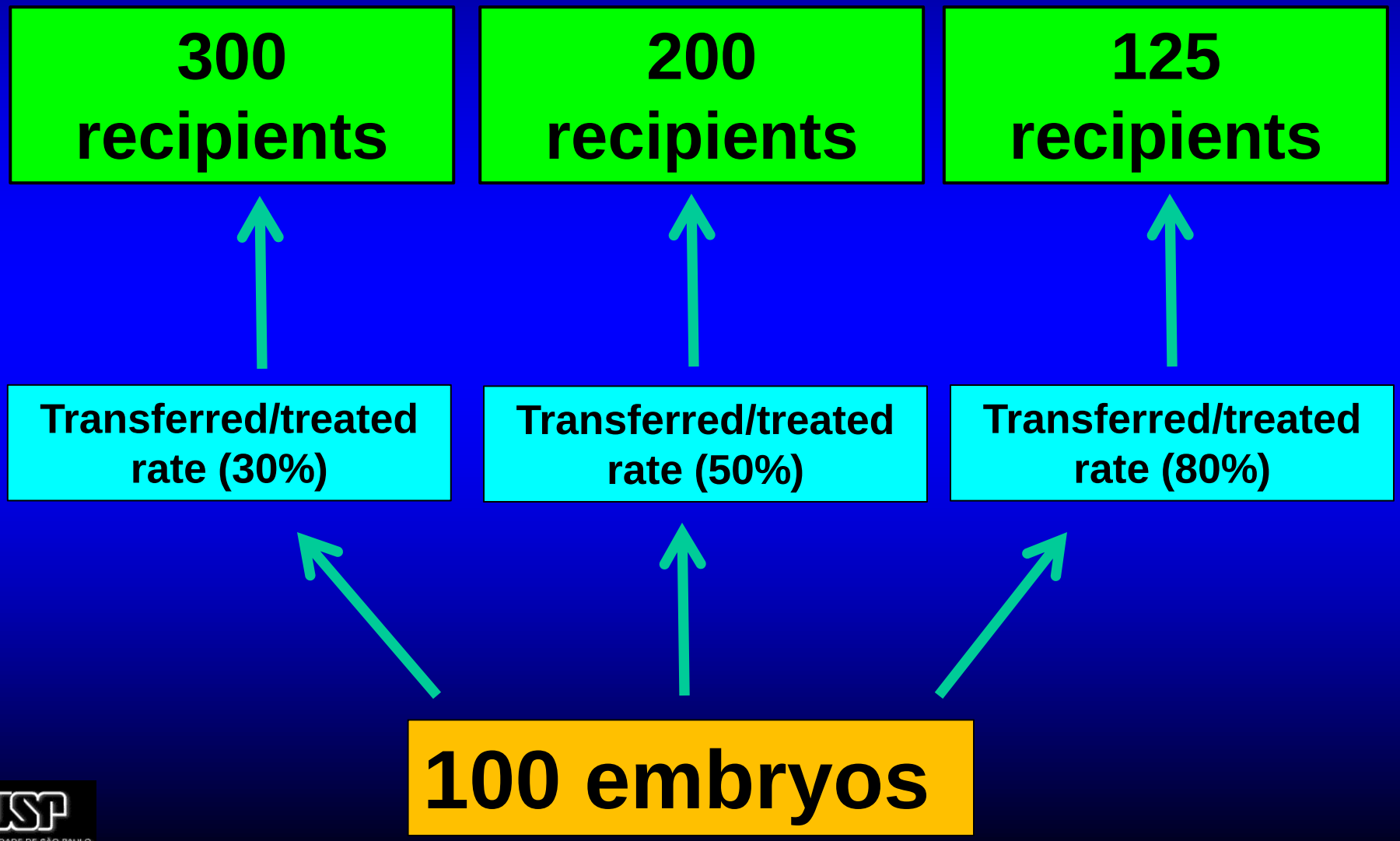
Estudos para aumentar a eficiência reprodutiva de receptoras de embrião

Transferred/treated rate



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1. Aumentar a taxa de aproveitamento

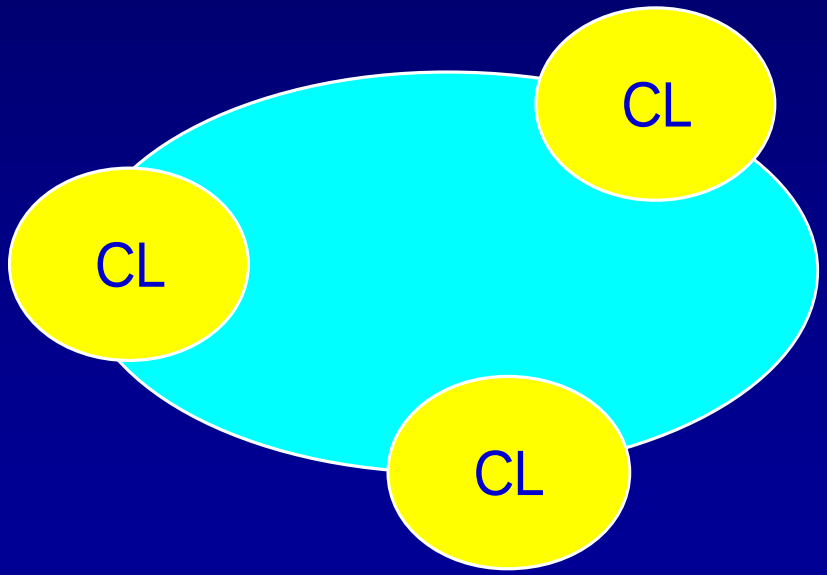
2. Aumentar a taxa de concepção

3, Aumentar a taxa de prenhez

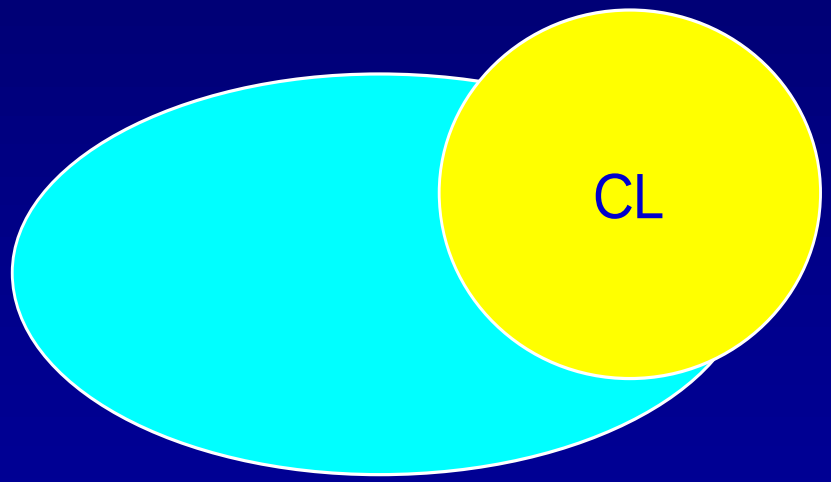
Diminuir o período parto / concepção e o intervalo entre partos

HIPÓTESE

eCG → ↑ P4 → ↑ PRENHEZ ?



Múltipla ovulação



↑ Área CL

Baruselli et al., 2000 (SBTE)

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(SBTE, 2000)

AUMENTO DA TAXA DE PRENHEZ EM RECEPTORAS DE EMBRIÃO BOVINO PELA UTILIZAÇÃO DO PROTOCOLO "OVSYNCH" COM INOVULAÇÃO EM TEMPO FIXO*

Baruselli, P.S.[1]; Marques, M.O.[1]; Carvalho, N.A.T.[1]; Valentim, R.[1]; Berber, R.C.A.[1]; Carvalho Filho, A.F.[1]; Madureira, E.H.[1]; Costa Neto, W.P.[2]

[1]Departamento de Reprodução Animal, FMVZ-USP, São Paulo, SP - CEP 05508-000
[2]Médico Veterinário autônomo

DINÂMICA FOLICULAR EM NOVILHAS RECEPTORAS DE EMBRIÃO BOVINO SUBMETIDAS À SINCRONIZAÇÃO DA OVULAÇÃO PARA INOVULAÇÃO EM TEMPO FIXO*

Baruselli, P.S.[1]; Marques, M.O.[1]; Carvalho, N.A.T.[1]; Valentim, R.[1]; Berber, R.C.A.[1]; Carvalho Filho, A.F.[1]; Madureira, E.H.[1]; Costa Neto, W.P.[2].

[1]Departamento de Reprodução Animal, FMVZ-USP, São Paulo, SP - CEP 05508-000
[2]Médico Veterinário autônomo

SUPERESTIMULAÇÃO OVARIANA DE RECEPTORAS DE EMBRIÕES BOVINOS VISANDO O AUMENTO DE CORPOS LÚTEOS, CONCENTRAÇÃO DE P4 E TAXA DE PRENHEZ*

Baruselli, P.S.[1]; Marques, M.O.[1]; Madureira, E.H.[1]; Bó, G.A.[2]; Costa Neto, W.P.[3]; Grandinetti, R.R.[3]

[1]Departamento de Reprodução Animal, FMVZ-USP, São Paulo, SP - CEP 05508-000.
[2]Instituto de Reproducción Animal Córdoba (IRAC); Universidad Católica de Córdoba; Argentina.
[3]Médico Veterinário autônomo.

n=519 recipientes

Arq. Fac. Vet. UFRGS, Porto Alegre, v.28, n.1, 2000 (Supl.)

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Estrus detection vs FTET

Group $PGF_{2\alpha}$ + Estrus (n=229)

$PGF_{2\alpha}$

Estrus detection

7 days

ET

D0 D2 D7 D7

After estrus

Group FTET (n=208)

BE+P4

400 UI eCG +
0,5 ml ECP + $PGF_{2\alpha}$

P4

FTET

D0 D8 D17

Rodrigues et al. SBTE (2007)

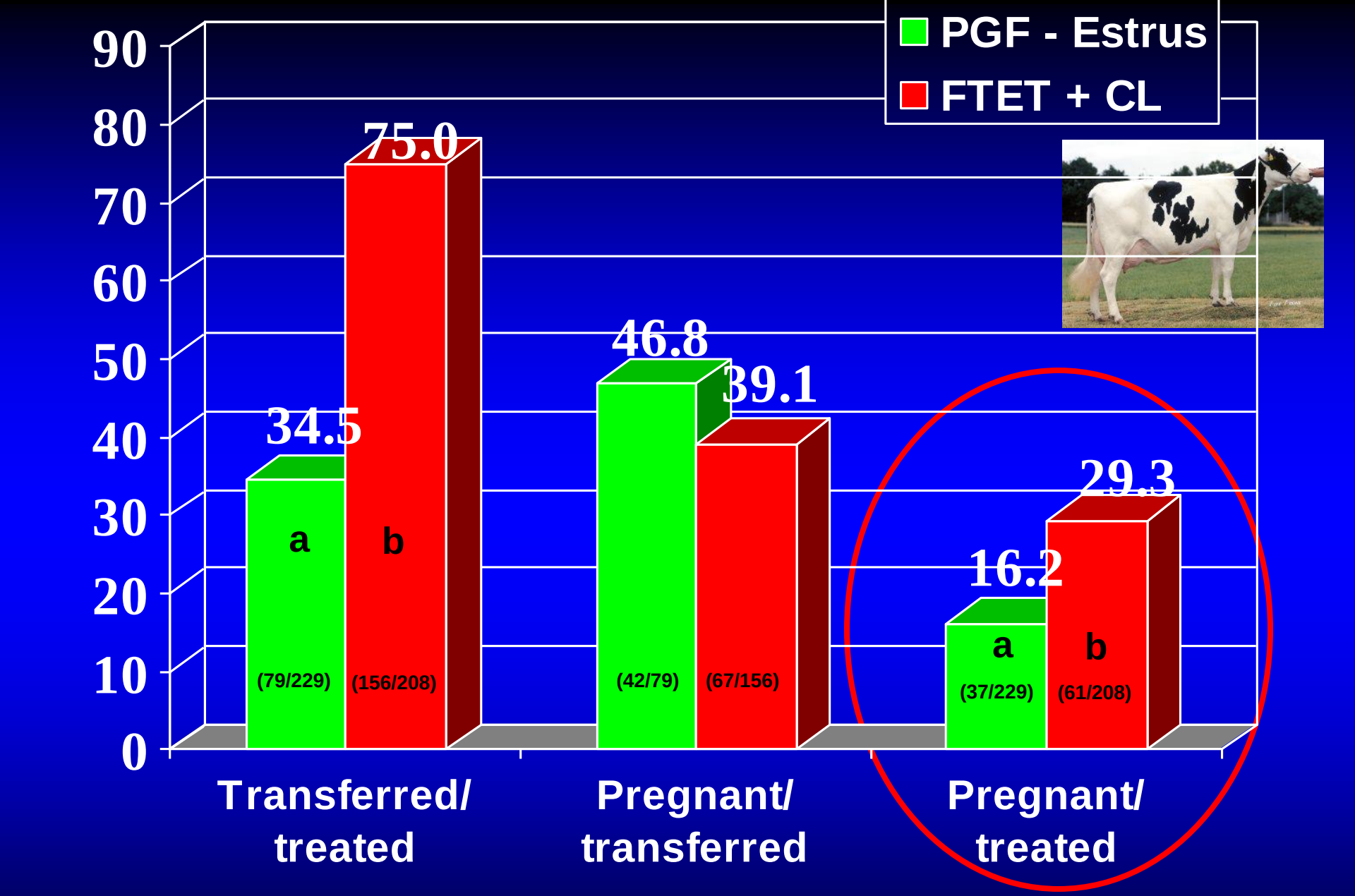


Figure. Pregnancy rates in Holstein repeat-breeder cows transferred 7 days after observation of a prostaglandin F-synchronized estrus or on Day 17 of a fixed-time embryo transfer synchronisation protocol

Rodrigues et al SBTE (2007)

Group FTET with CL on Day 0 (n=208)

BE+P4

400 UI eCG +
0,5 ml ECP + $PGF_{2\alpha}$

TETF

P4

D0

D8

D17

Group FTET without CL on Day 0 (n=221)

BE+P4

400 UI eCG +
0,5 ml ECP + $PGF_{2\alpha}$

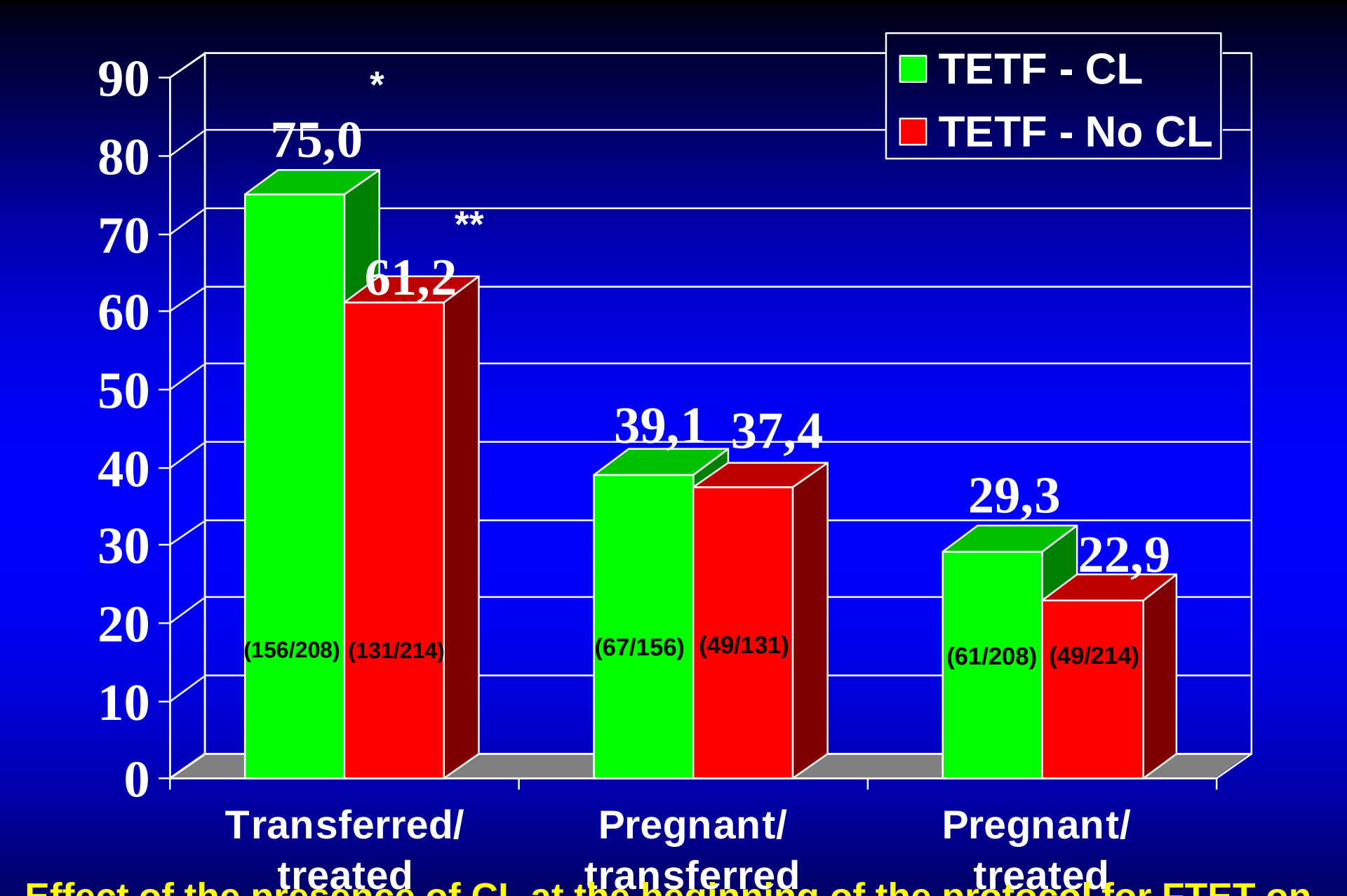
TETF

P4

D0

D8

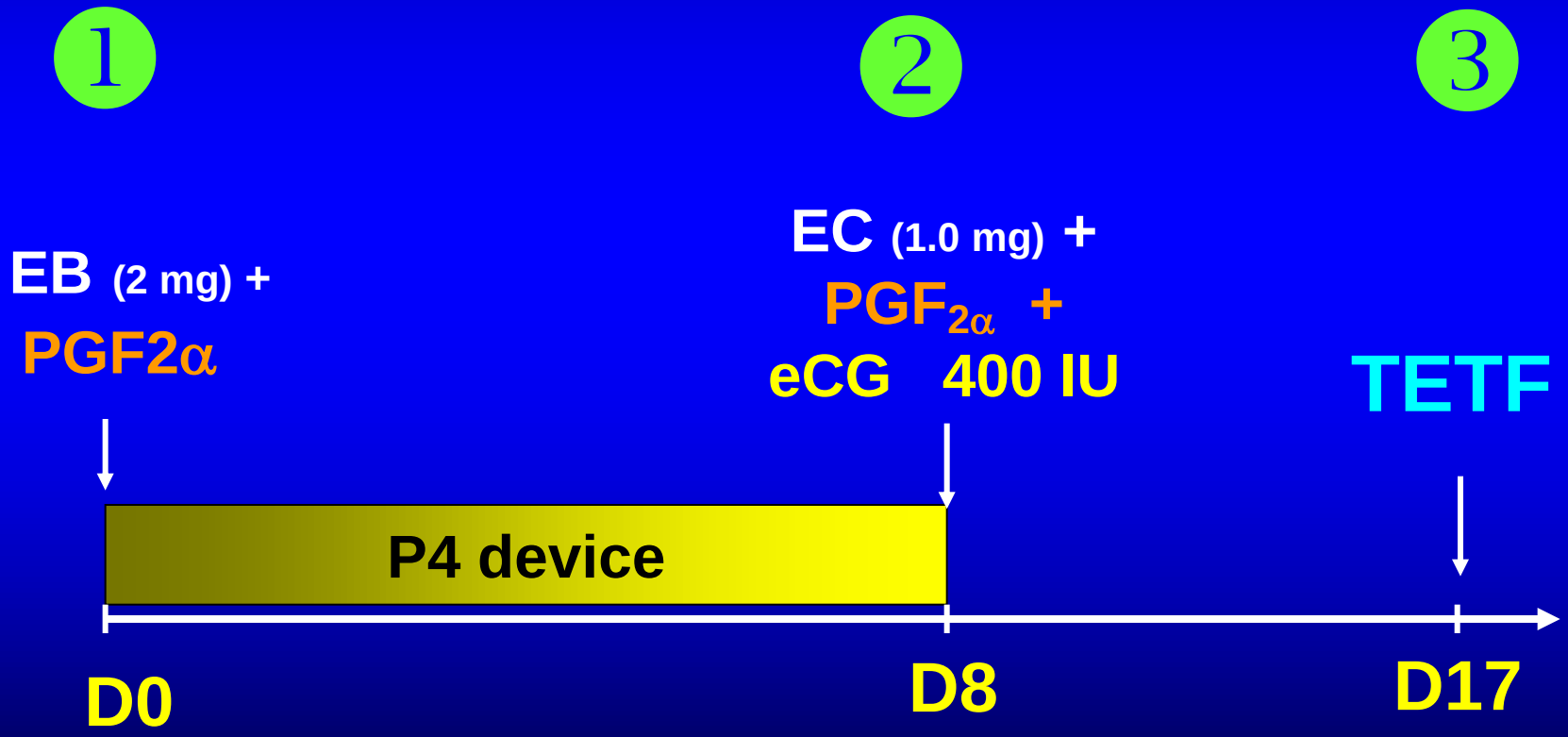
D17



Effect of the presence of CL at the beginning of the protocol for FTET on fertility rates of high-producing Holstein repeat-breeder recipients

Rodrigues et al SBTE (2007)

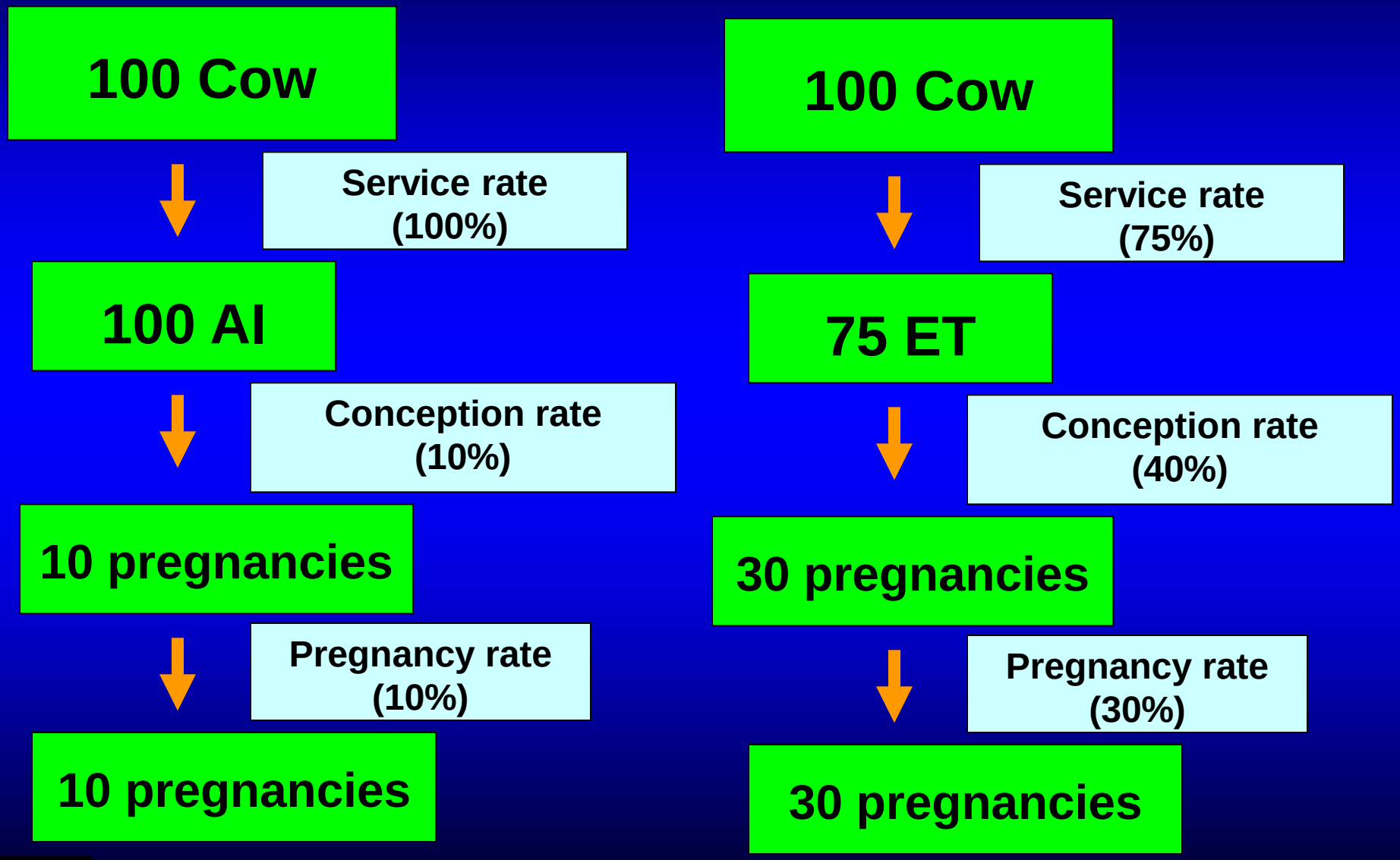
New protocol for fixed-time embryo transfer (FTET) – IETS 2010 (three treatments)



Baruselli et al., 2010

TAXA DE PRENHEZ (IATF vs TETF)

REPEAT BREEDER (≥4 SERVICE)



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Using sex-sorted sperm in embryo production

Animal Reproduction Science 127 (2011) 148–153

Contents lists available at ScienceDirect

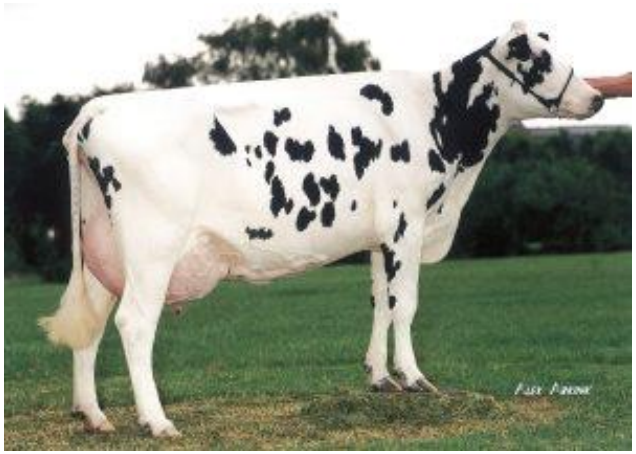
Animal Reproduction Science

journal homepage: www.elsevier.com/locate/anireprosci

Timing of insemination using sex-sorted sperm in embryo production with *Bos indicus* and *Bos taurus* superovulated donors

J.G. Soares[a,*], C.M. Martins[b], N.A.T. Carvalho[c], A.C. Nicacio[a], A.L. Abreu-Silva[a], Evanil P. Campos Filho[d], J.R.S. Torres Júnior[a], M.F. Sá Filho[e], P.S. Baruselli[e,**]

[a] Universidade Estadual do Maranhão (UEMA), São Luís-MA, Brazil
[b] Fertiliza Consultoria Reprodutiva, Poços de Caldas-MG, Brazil
[c] APTA, Pólo Regional do Vale do Ribeira, Registro-SP, Brazil
[d] Sexing Technologies, Sertãozinho, São Paulo, Brazil
[e] Departament of Animal Reproduction, FMVZ-USP, CEP 05508-000, São Paulo, Brazil



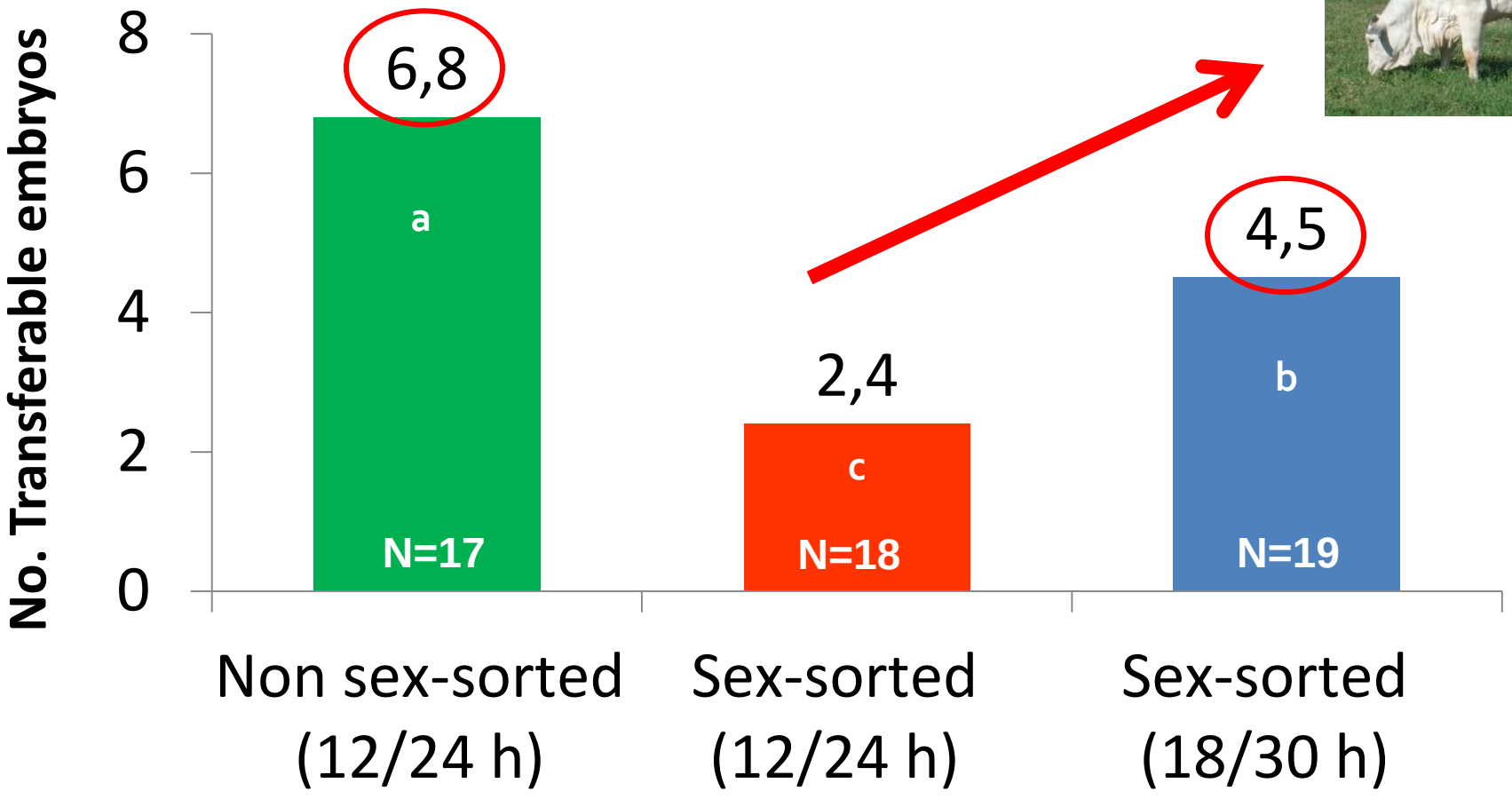
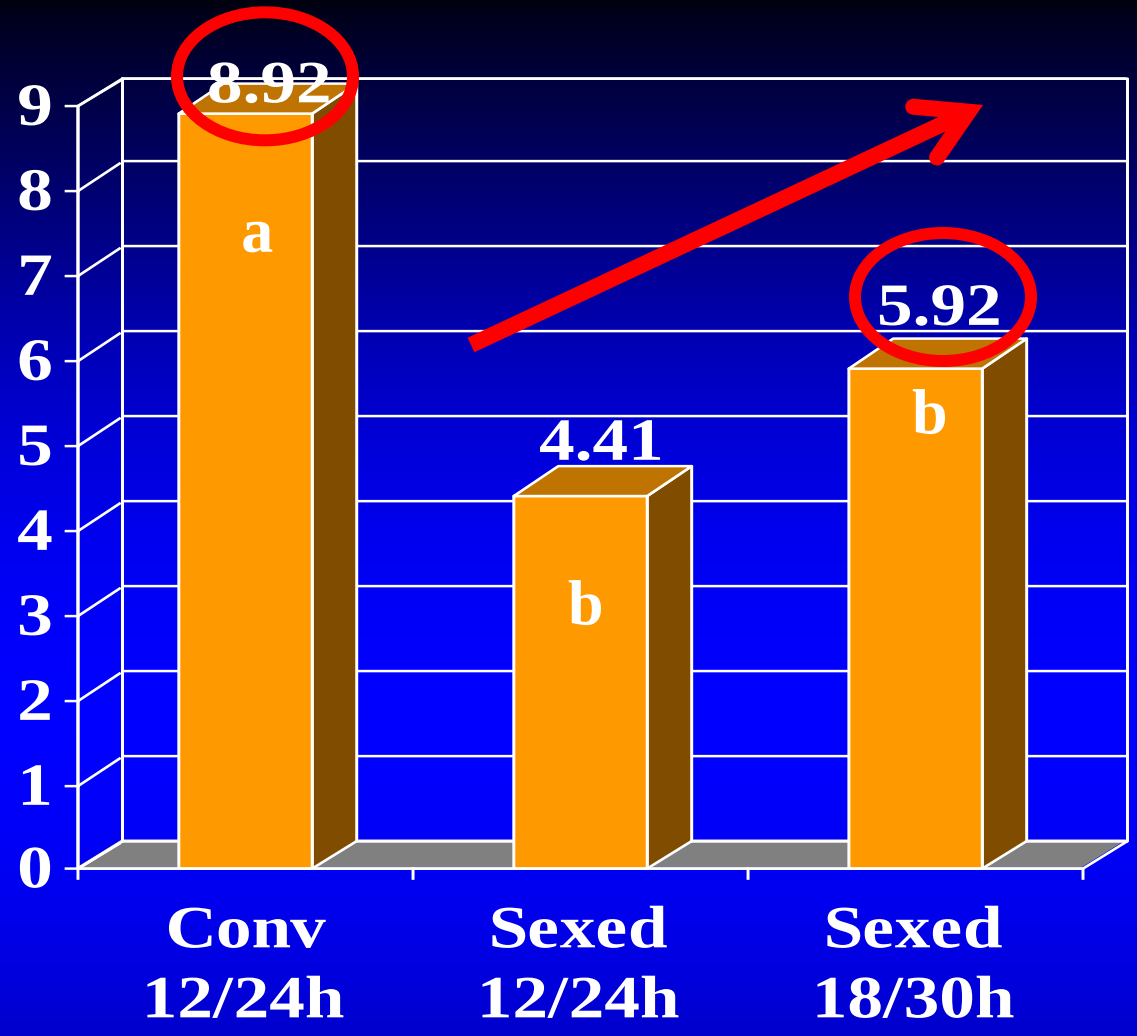


Figure. Number of transferable embryos from superovulated Nelore cows timed inseminated with sex-sorted sperm or non sex-sorted sperm.

Soares et al., 2011 ARS (*in press*)

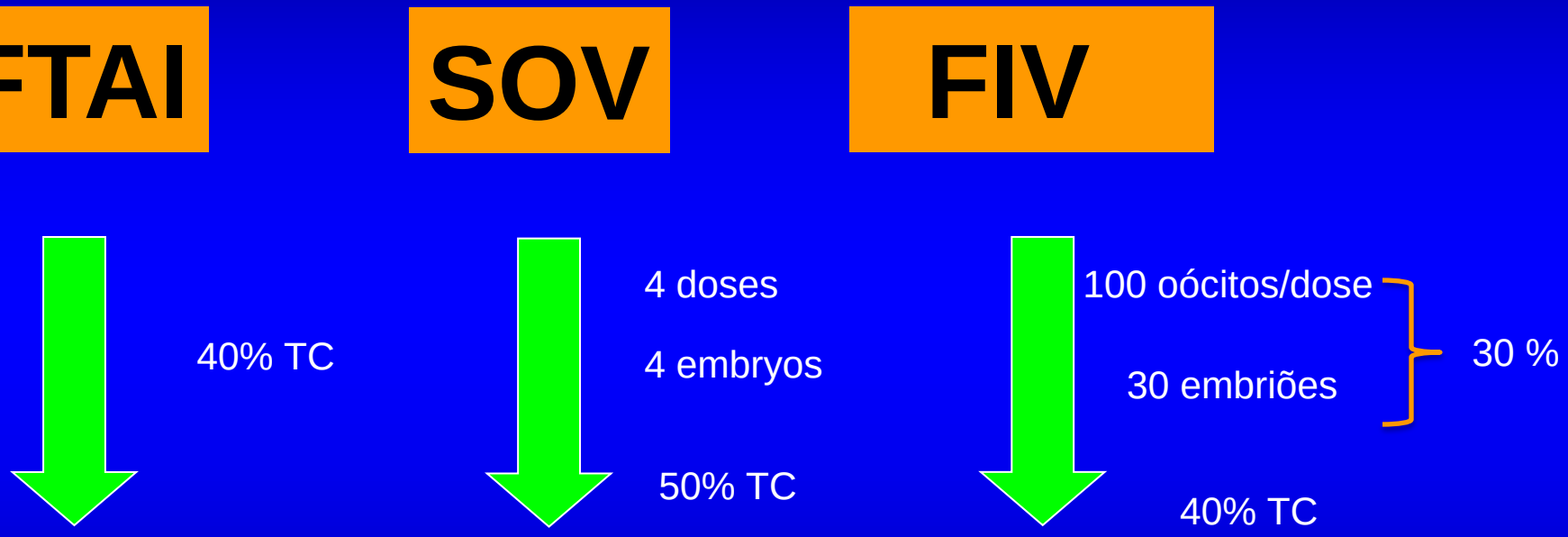


Transferable embryos

Figure - Effect of type of semen (conventional vs. sexed) and timed artificial insemination after LH (12 and 24 vs. 18 and 30) in Holstein heifers (Bos taurus) superstimulated, Poços de Caldas, MG, 2008.

Martins et al., 2008

Efficiency of sex-sorted sperm applied in different biotechnologies



0.4 conception/ dose

0.5 conception/ dose

12 conception/ dose

FTET in Nelore recipient
Sexed semen - 88% female

Brazilian ET market

***Bos taurus* donnors**

Lactating *Bos taurus* recipients

To improve genetic an reproductive efficiency

AGRADECIMENTOS

• Alunos de pós graduação

- Everton Luis Reis
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- Roberta Ferreira
- Bruno Monteiro

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- Fazendas colaboradoras
- Empresas privadas dos setor

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XXVII Reunião Anual da Sociedade Brasileira de Tecnologia de Embriões
29 de Agosto a 01 de Setembro - 2013
Praia do Forte - BA

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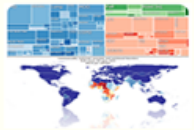
REUNIÃO ANUAL DA SOCIEDADE BRASILEIRA DE TECNOLOGIA DE EMBRIÕES
29 DE AGOSTO A 01 DE SETEMBRO - 2013
PRAIA DO FORTE - BA

Início | A Sociedade | Notícias | Jornal O Embrião | Reunião Anual | Premiações | Anais das reuniões anuais | Parceiros | Contato

Notícias

Pesquisadores criam um "Google Map" do metabolismo humano
Equipe internacional de pesquisadores lançaram o "Google Map"...

Bebê pode ter sido curado da AIDS



O quanto o seu país é saudável?
Quer comparar o impacto do tabagismo na Estonia e na Argentina?

Farmacologia Veterinária
Os professores

Área do Associado

Nossos associados possuem acesso a conteúdos exclusivos, recebem impresso o Jornal O embrião e são isentos da taxa de inscrição para a Reunião Anual. Ainda não é associado? Associe-se | Esqueci minha senha

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