



DAIRY CATTLE REPRODUCTION COUNCIL

2020 DCRC Virtual Annual Meeting

November 10-12, 2020

Taking place virtually

Fixed-time artificial insemination programs for 1st postpartum service of lactating dairy cows

M.Sc. Carlos Eduardo Cardoso Consentini¹ and

Dr. Roberto Sartori¹

¹Department of Animal Sciences, Luiz de Queiroz College of Agriculture
of University of São Paulo, Brazil (ESALQ/USP)



Outline

- **Introduction and proposal**
- **Material and methods**
- **Results (research and field data)**
- **Final considerations**

Genetic selection

Nutrition and Reproduction

Infrastructure

Management

Modern dairy herds



↑ 305-d milk production
> 9,000 to 12,000 kg

Poor fertility or low reproductive efficiency?

Holistic vision

Comfort / Environment / Housing

Nutrition

Heat stress

Dry period

Transition period

Genetic selection

Clinical diseases

Metabolic disorders

Reproductive management

Systematized reproductive management

Intensify the use of FTAI for 1st service

Fertility programs for 1st service

Re-inseminate with estrus detection (optimized service rate and fertility)

Intensify the use and fertility of FTAI programs for Resynch

↑ 21-d pregnancy rate

↓ Calving interval

↑ Milk production/cow/year

More cows in the "High Fertility Cycle"

What should occur during FTAI programs to optimize fertility of lactating dairy cows?

↑ New follicular wave emergence

↑ P4 concentrations (presence of CL) during the development of the preovulatory follicle

↓ P4 concentrations near FTAI

Adequate E2 concentrations at the end of the protocol (expression of estrus) and high ovulation rates

↓ % of persistent follicles

↑ oocyte quality and competence

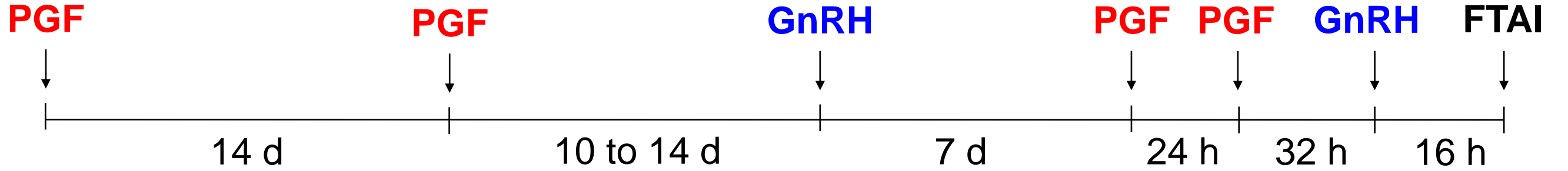
↓ double ovulation

Adequate gamete transport and fertilization

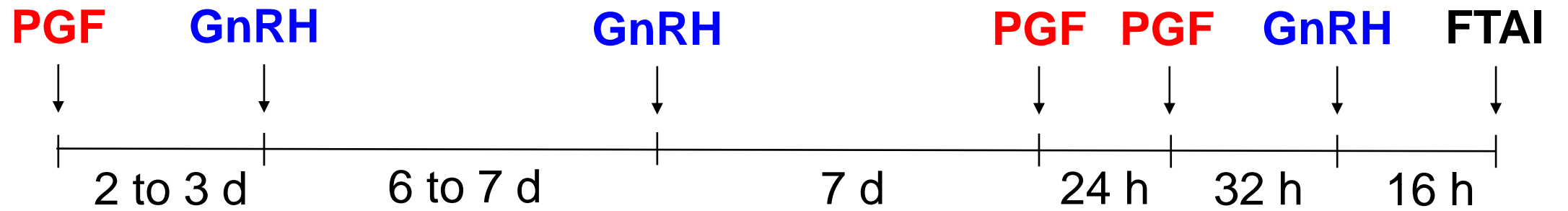
Adequate uterine environment after FTAI

↑ Fertility = ↑ P/AI + ↓ Pregnancy loss

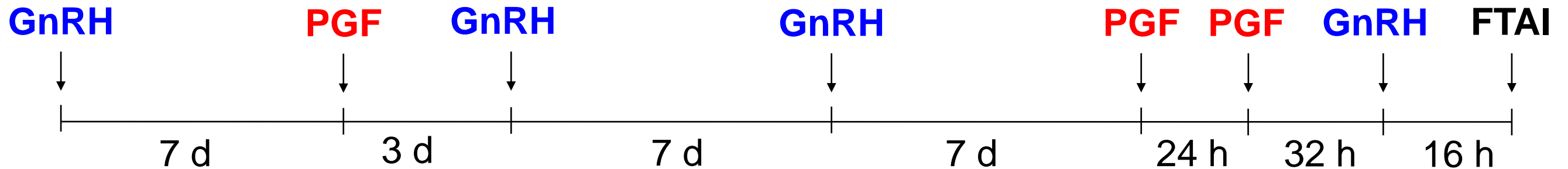
Presynch-Ovsynch



G-6-G



Double-Ovsynch





DAIRY CATTLE REPRODUCTION COUNCIL

Dairy Reproduction Protocols

New technologies have become available in recent years to improve reproductive success. These technologies include improvements to traditional approaches to reproductive management (heat detection and A.I.) as well as to approaches that synchronize A.I. so that all cows and/or heifers are inseminated at one time (timed-A.I. programs). Combinations of traditional and timed A.I. programs are also used on many farms. Regardless of the approach, a focused effort on reproductive management has been shown to increase pregnancy rates, translating to greater reproductive efficiency on the dairy.

Synchronization protocols evolve rapidly as newer procedures are tested and improvements are made. To help veterinarians and industry professionals deal with rapid change and make informed decisions related to synchronization protocols, the Dairy Cattle Reproduction Council (DCRC) has created synchronization protocol sheets for dairy cows and dairy heifers. The documents outline established synchronization protocols that may help dairy producers improve on-farm reproductive performance.

This document is intended for educational purposes as consultants work with their dairy producer clients to make reproductive management decisions; the DCRC does not endorse one protocol over another, nor does DCRC endorse synchronization protocols over any of the other approaches to dairy cattle reproduction. The protocol sheets will be reviewed annually by representatives from the DCRC. New protocols will be included when they are validated in controlled studies.

[Dairy Cow Protocol Sheet \(Updated 2018\)](#)

[Dairy Heifer Protocol Sheet \(Updated 2018\)](#)

[Dairy Cow Protocol Sheet - Spanish Translation \(Updated 2018\)](#)

[Dairy Heifer Protocol Sheet - Spanish Translation \(Updated 2018\)](#)



DAIRY CATTLE REPRODUCTION COUNCIL

"Helping farmers optimize fertility in dairy cattle"

Reproductive Management Strategies for Dairy Cows

Detection of estrus followed by timed AI

For herds with efficient and accurate estrus-detection systems

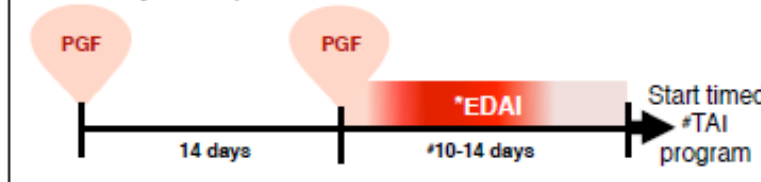


Definitions and comments:
EDAI = Estrous detection followed by AI
*Start and stop dates for EDAI depend on voluntary waiting period (VWP) and the reproductive goals of the each herd

Presynchronization methods used before TAI

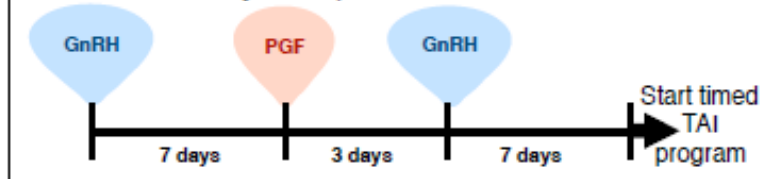
Used with TAI programs below to increase pregnancy per AI (P/AI). Can be used with or without EDAI

A. "PreSynch" (2xPGF - TAI)

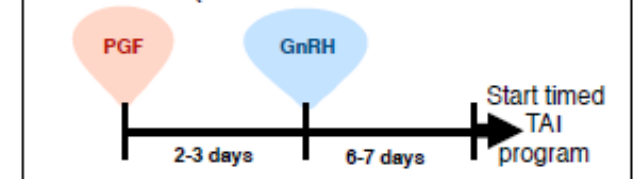


Definitions and comments:
PGF = Prostaglandin F_{2α}
GnRH = Gonadotropin-releasing hormone
*Intensity of color in EDAI denotes period (2-7 days) to expect most cows in estrus; *TAI program starting 10-12 days after PGF results in higher fertility

B. "Double OvSynch" (GnRH-PGF-GnRH - TAI)



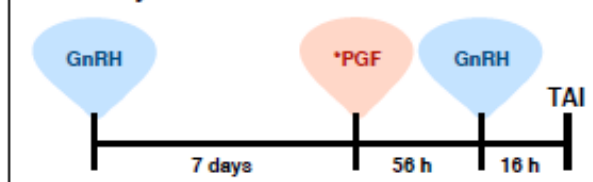
C. "G-6-G" (PGF-GnRH - TAI)



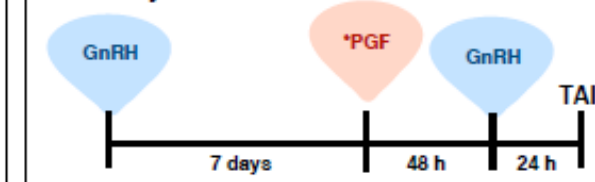
Synchronization methods for TAI

Can be used alone or with presynchronization (see above), and with or without EDAI detection. Presynchronization increases fertility. The use of the CIDR benefits fertility of cows with no CL starting TAI.

A. "OvSynch 56"

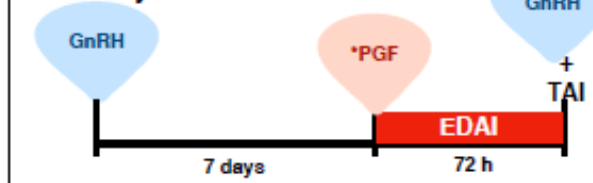


B. "OvSynch 48"

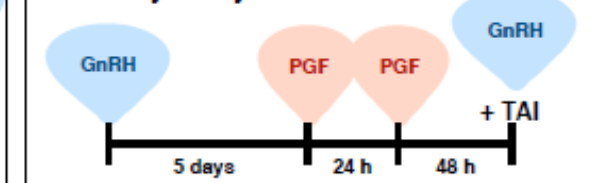


CIDR can be used in any program being inserted at 1st GnRH and removed at PGF

C. "CoSynch 72"





D. "5-day CoSynch"



*A second PGF 24 h after the first PGF improves luteolysis and fertility

Induction of final ovulation in FTAI protocols

➤ E2 esters → Cypionate or Benzoate

-  estrus expression at the end of the protocol
(Souza et al., 2007; Pereira et al., 2013)
-  variation in time of ovulation at the end of the protocol
(Pancarci et al., 2002; Souza et al., 2009)

➤ GnRH

-  estrus expression up to FTAI
-  variation in time of ovulation at the end of the protocol

General Proposal

- To implement a reproductive program involving a presynchronization prior to the FTAI protocol initiated with GnRH aiming to improve fertility of the 1st FTAI postpartum

Objectives

- To test 3 strategies to induce ovulation for FTAI at the end of the reproductive program

- EC
- GnRH
- EC + GnRH



Proceedings of the 33rd Annual Meeting of the Brazilian Embryo Technology Society (SBTE); Ilha de Comandatuba, BA, Brazil, August 15th to 19th, 2019. Abstracts.

010 TAI/FTET/AI

Strategies for induction of ovulation for fixed-time ai in lactating dairy cows submitted to a novel presynchronization protocol

Carlos Eduardo Cardoso Consentini¹, Leonardo de França e Melo²,
Jessica Cristina Lemos Motta¹, Rodrigo Lemos Olivieri Rodrigues Alves¹, Lucas Oliveira e Silva¹,
Mariana Contini¹, Felipe Belchior Sargaço¹, Natália Picoli Folchini¹, Guilherme Madureira¹,
Milo Charles Wiltbank³, Roberto Sartori¹

¹ESALQ/USP - Department of Animal Science, Luiz de Queiroz College of Agriculture (ESALQ), University of São Paulo, Piracicaba, SP; ²GENEAL - Geneal – Genetics and Animal Biotechnology, Uberaba, MG, Brazil; ³UW - Madison - Department of Dairy Science, University of Wisconsin - Madison, Madison, WI 53706, USA.

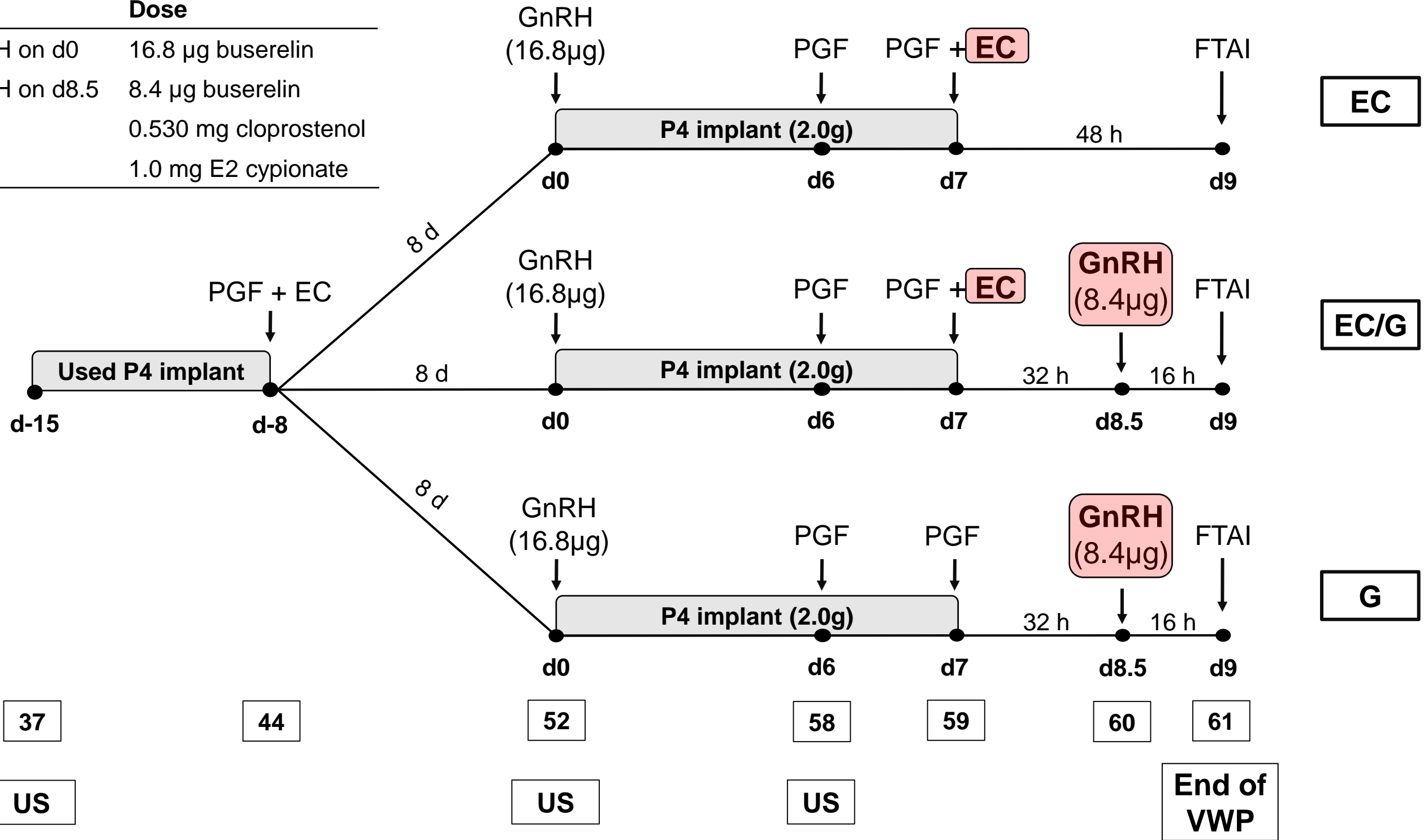
Material and methods

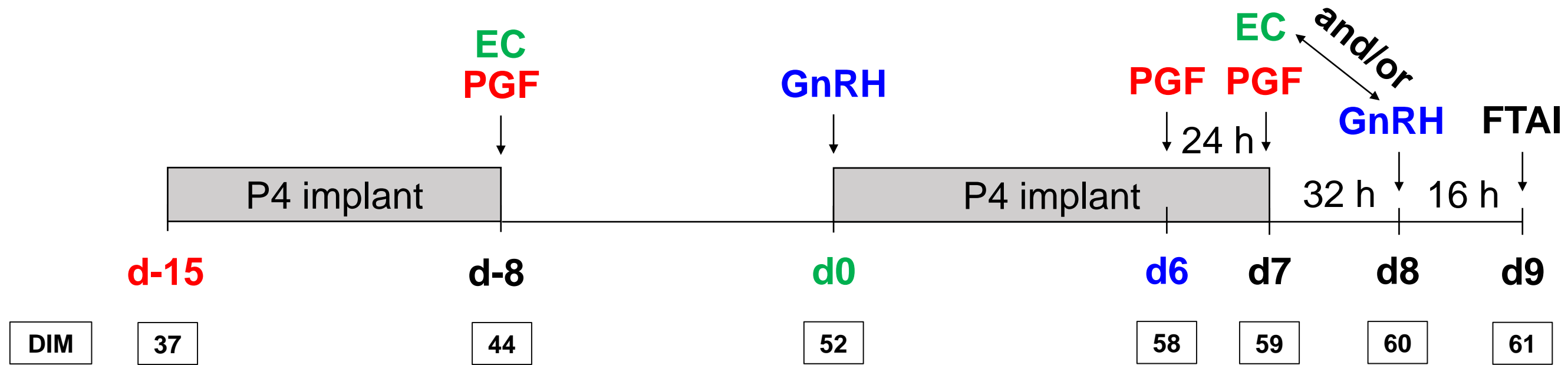
- 6 farms
- 909 lactating dairy cows → 38% enrolled in hot season
- Milk production at the onset of breeding protocol: 39.8 ± 0.67 kg/d
- BCS on D0: 3.22 ± 0.02

Presynchronization protocol

1st FTAI postpartum protocols

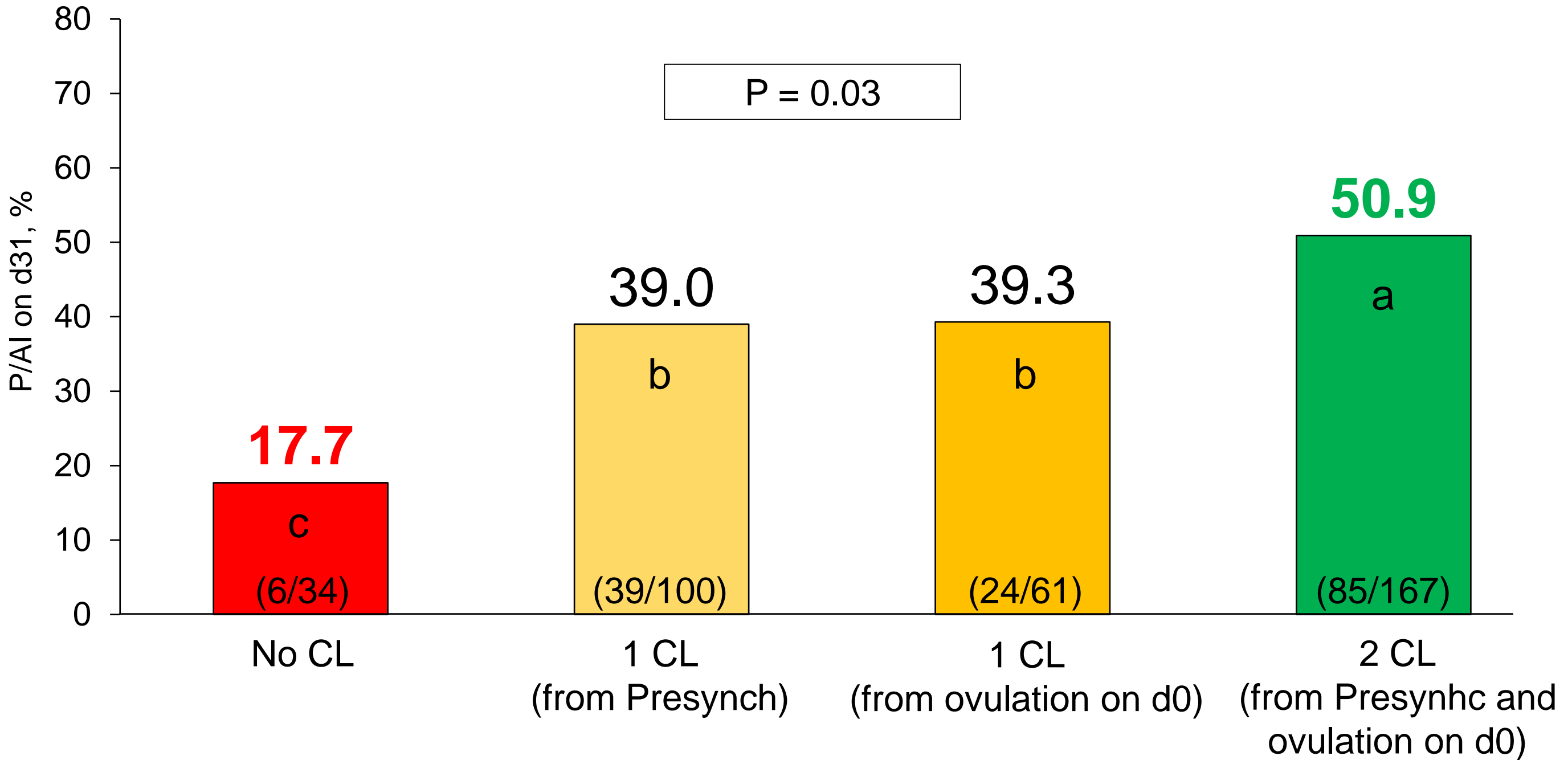
Item	Dose
GnRH on d0	16.8 µg buserelin
GnRH on d8.5	8.4 µg buserelin
PGF	0.530 mg cloprostenol
EC	1.0 mg E2 cypionate





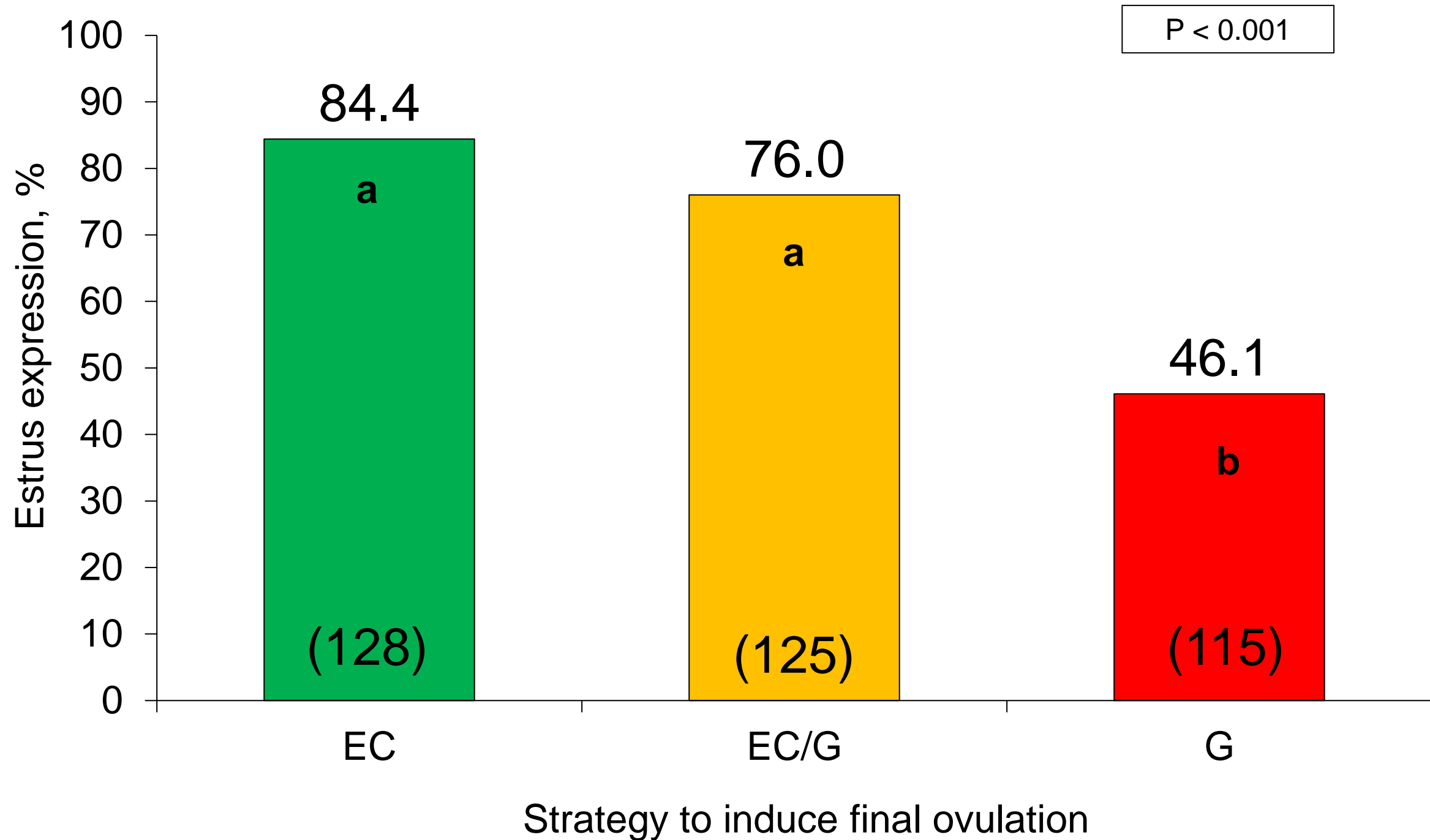
Item	CL on d-15, % (n/n)	CL on d0, % (n/n)	CL at PGF, % (n/n)	Ovulation after d0, % (n/n)
Primiparous	67.4 (192/285)	80.8 (193/239)	91.7 (155/169)	63.4 (103/162)
Multiparous	67.9 (235/346)	81.1 (240/296)	90.3 (187/207)	62.5 (125/200)
Overall	67.7 (427/631)	80.9 (433/535)	91.0 (342/376)	63.0 (228/362)

P/AI (31d) according to type of CL at PGF treatment



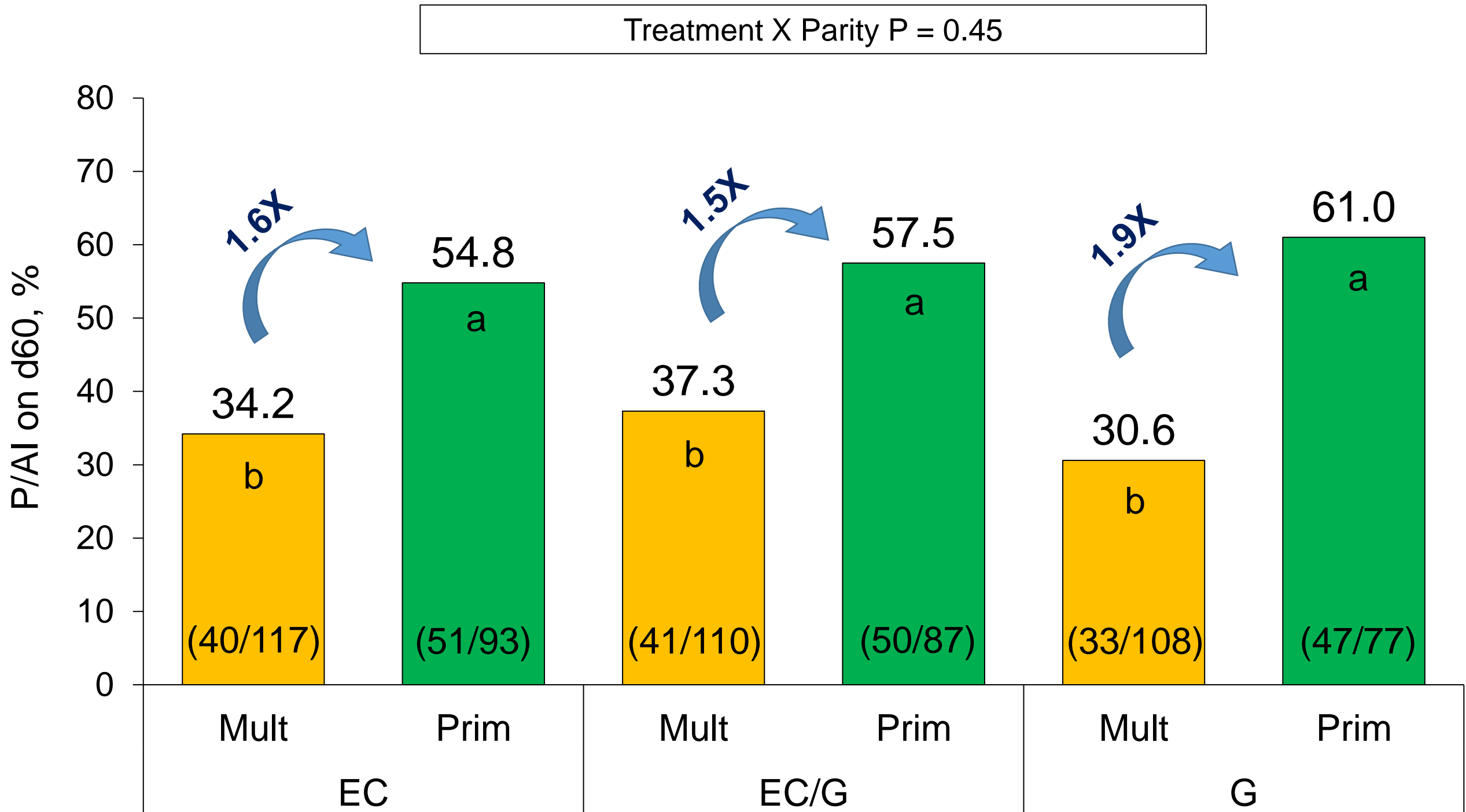
Expression of estrus according to the strategy to induce final ovulation

Consentini et al. (2020 – In preparation)



P/AI on d60 according to parity and treatment

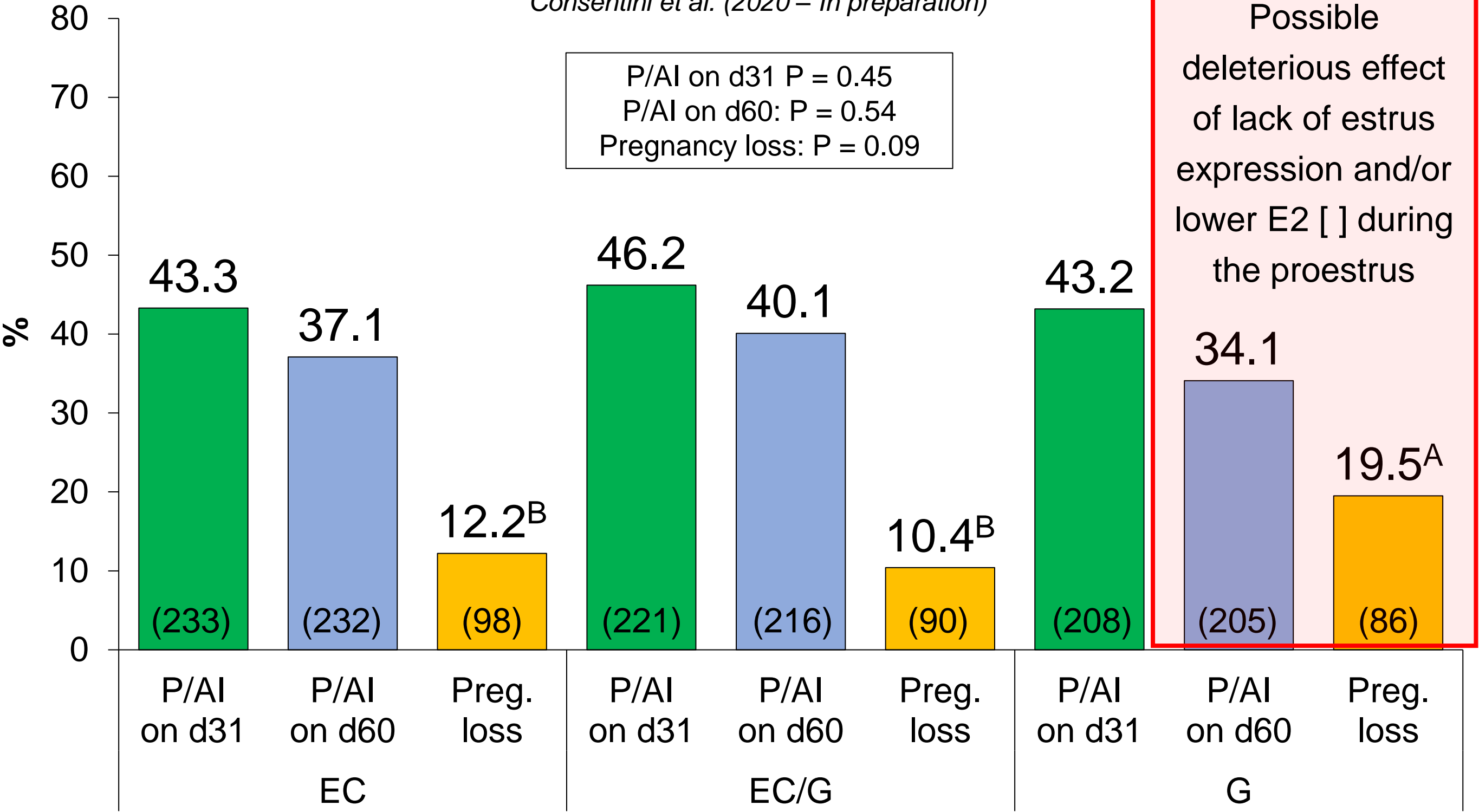
Consentini et al. (2020 – In preparation)



P/AI and pregnancy loss according to strategy to induce ovulation for FTAI

Consentini et al. (2020 – In preparation)

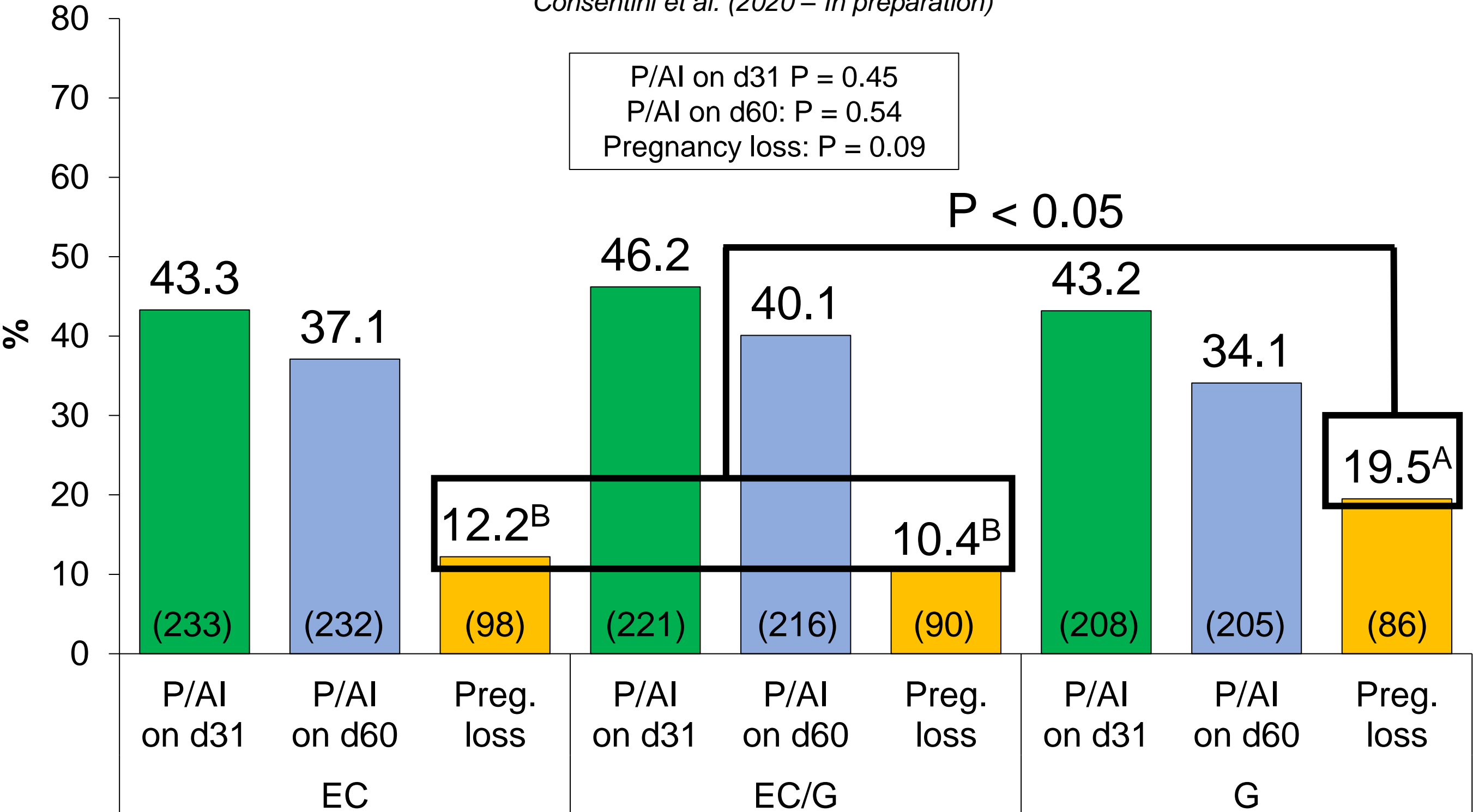
P/AI on d31 P = 0.45
P/AI on d60: P = 0.54
Pregnancy loss: P = 0.09



Possible deleterious effect of lack of estrus expression and/or lower E2 [] during the proestrus

P/AI and pregnancy loss according to strategy to induce ovulation for FTAI

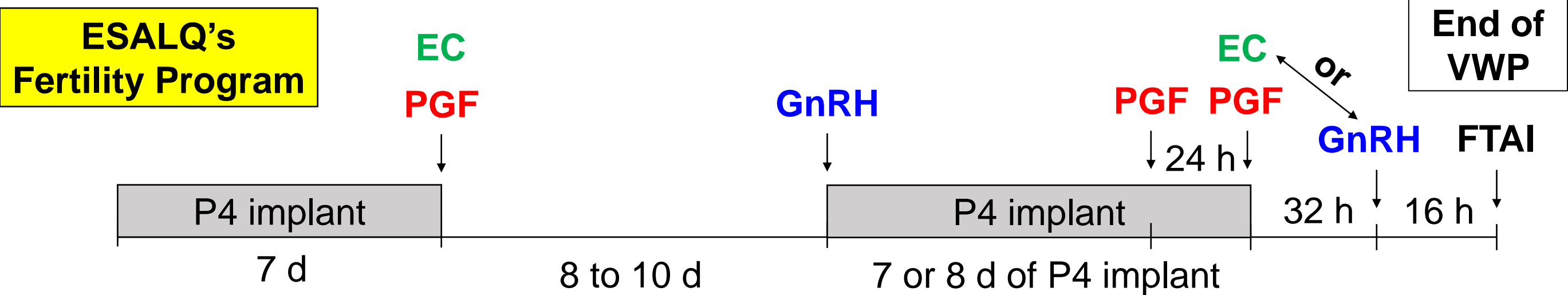
Consentini et al. (2020 – In preparation)



Use of the ESALQ's fertility program (experiment and field data)

Implementation and adjustments of the
program to increase fertility of the dairy herds





P/AI of cows submitted to regular FTAI protocols or the fertility program

Item	Number of cows	Regular FTAI protocols ¹	ESALQ's Fertility Program
Farm A ²	662	43.9% ^b	↑ 32% → 57.9%^a
Farm B ²	416	30.1% ^b	↑ 54% → 46.4%^a

¹ FTAI protocols for first service initiated at random stages of estrous cycle

² Strategy to induce final ovulation was EC at P4 removal

Final considerations

FTAI for first service is a key tool to increase the likelihood of cows becoming pregnant right after the end of VWP, especially in herds with low service rates. Moreover, the so-called fertility programs can generate superior fertility.

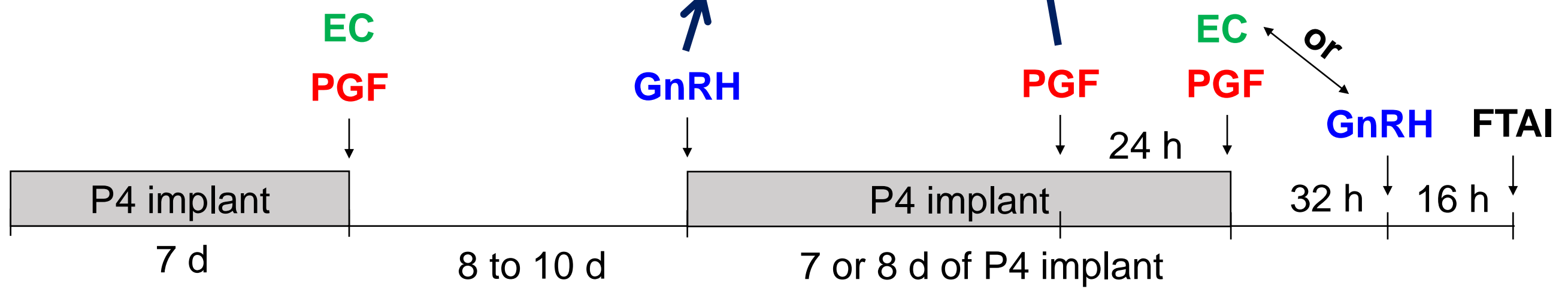
Greater fertility compared to FTAI protocols initiated at random stages of estrous cycle

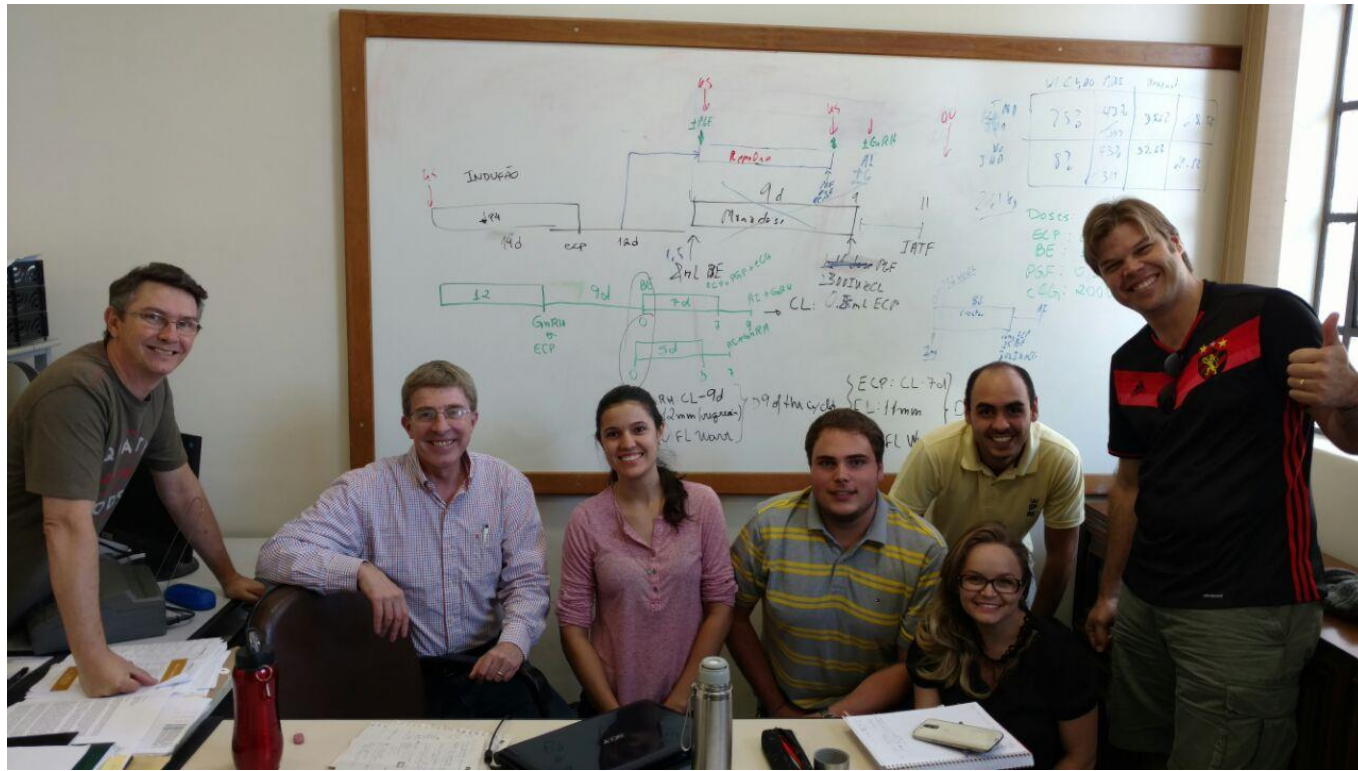
ESALQ's Fertility Program

> 80% of cows with CL

> 90% of cows with ≥ 1 CL (\uparrow P/AI)

EC increased estrus expression (\downarrow pregnancy loss)







Collaboration / Acknowledgments

Roberto Sartori
Milo Wiltbank

Leonardo Melo
Alexandre Prata
Jessica Motta
Guilherme Madureira
Rodrigo Lemos
Lucas Oliveira
Natália Folchini
Jessica Drum
Pedro Monteiro

Mariana Contini
Danielle Gurgeira
Mayara Silvestri
Mateus Silva

Rodolfo Mingoti
Gabriel Sandoval
Alex Souza
Tiago Carneiro
Luiz Moroz
Flavio Aragon
Felipe Sargaço
Artur Costa
Ana Elisa Barreto
Bruno Gonzales
Jorge Gonzales
Robson Vilela
Sergio Soriano
Alex Sica
Tattiany Abadia





DAIRY CATTLE REPRODUCTION COUNCIL

Thank You
FARMERS

Work hard, study hard, try to understand processes and people, and always pass forward good feelings to others

Carlos Eduardo Cardoso Consentini

carlos.consentini@usp.br

Roberto Sartori

robertosartori@usp.br

