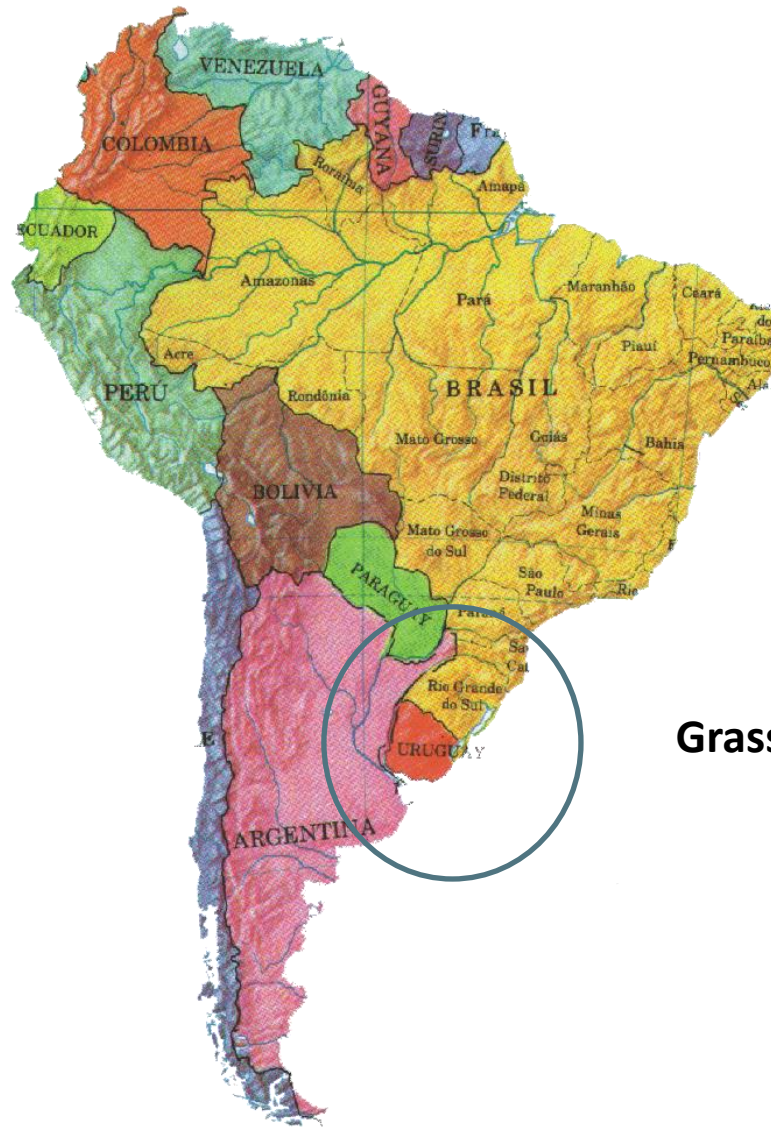


# The effect of seasonal daily live weight gain in females calves on reproductive performance

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**Grassland/steppe**

# Uruguay: some general figures



- Stock: 11 million of cattle (4.2 million of cows)
- Cattle with whole tracking (allows to identify the origin of the product at any time during the process)



# Uruguay: some general figures



- No hormones used (by law since 1978)
- Without animal protein in feed (by Law since 1996).
- Country free of BSE, Scrapie and Maedi-Visna.
- Uruguay is the 7<sup>th</sup> (beef) and 3<sup>rd</sup> (sheep meat) exporter

# Uruguay: some general figures



- Beef represents 30% of the total exportations of the country.
- 80% of the beef produced is exported.
- Livestock production takes 87% of the total area of Uruguay
- Beef consumption: 61 kg beef meet/hab/year

# Unsubsidized production systems



# Main resource of food for cows and calves : NATIVE PASTURES



# Characteristics of native pastures in Uruguay

- Crude Protein: 7-11%
- Energy: 1.8 – 2.0 Mcal/kg DM (7.5 - 8.4 MJ/kg DM)
- Digestibility of DM: 40-50 %

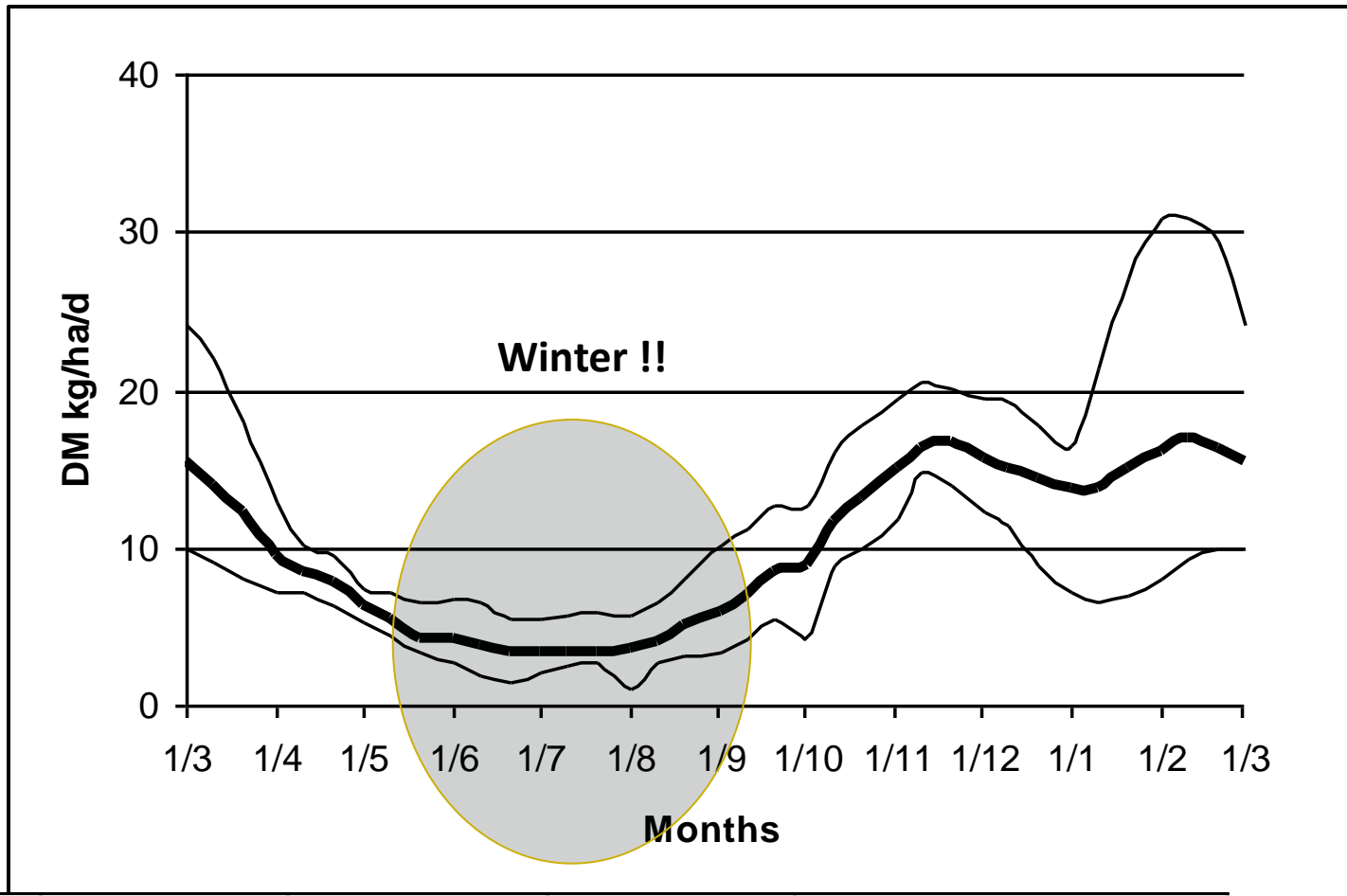




**Open sky: weather dependent**



# Daily growing rate of native pastures



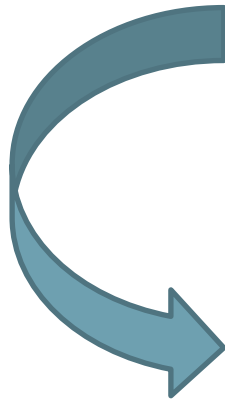
AUTUMN	WINTER	SPRING	SUMMER	TOTAL PRODUCTION
				DM (kg/ha/d)
<b>23.40%</b>	<b>9.70%</b>	<b>28.90%</b>	<b>38%</b>	<b>3626</b>

# Some strategies developed to manage cows/calves on these pastoral conditions

- Adequate stocking density or management to avoid overgrazing (sward structure, height and species)
- Improved pastures
- Strategic supplementation



**Management**



# Some strategies developed to manage cows/calves on these pastoral conditions

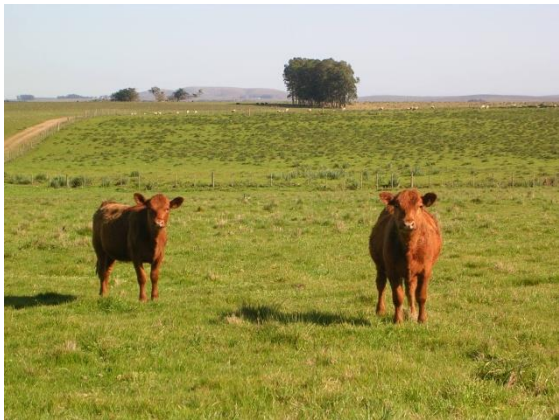
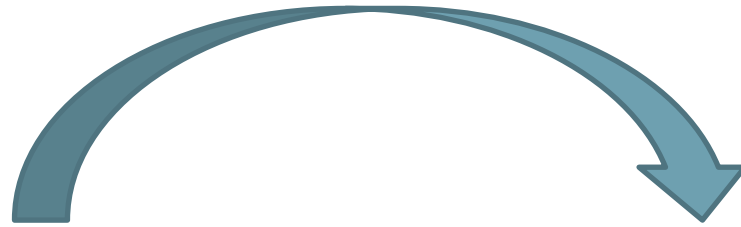
- Adequate stocking density or management to avoid overgrazing (sward structure, height and species)
- Improved pastures
- Strategic supplementation

# Strategic supplementation

- First winter of the female calf (after weaning)
- 90 days of a concentrate to avoid live weight losses



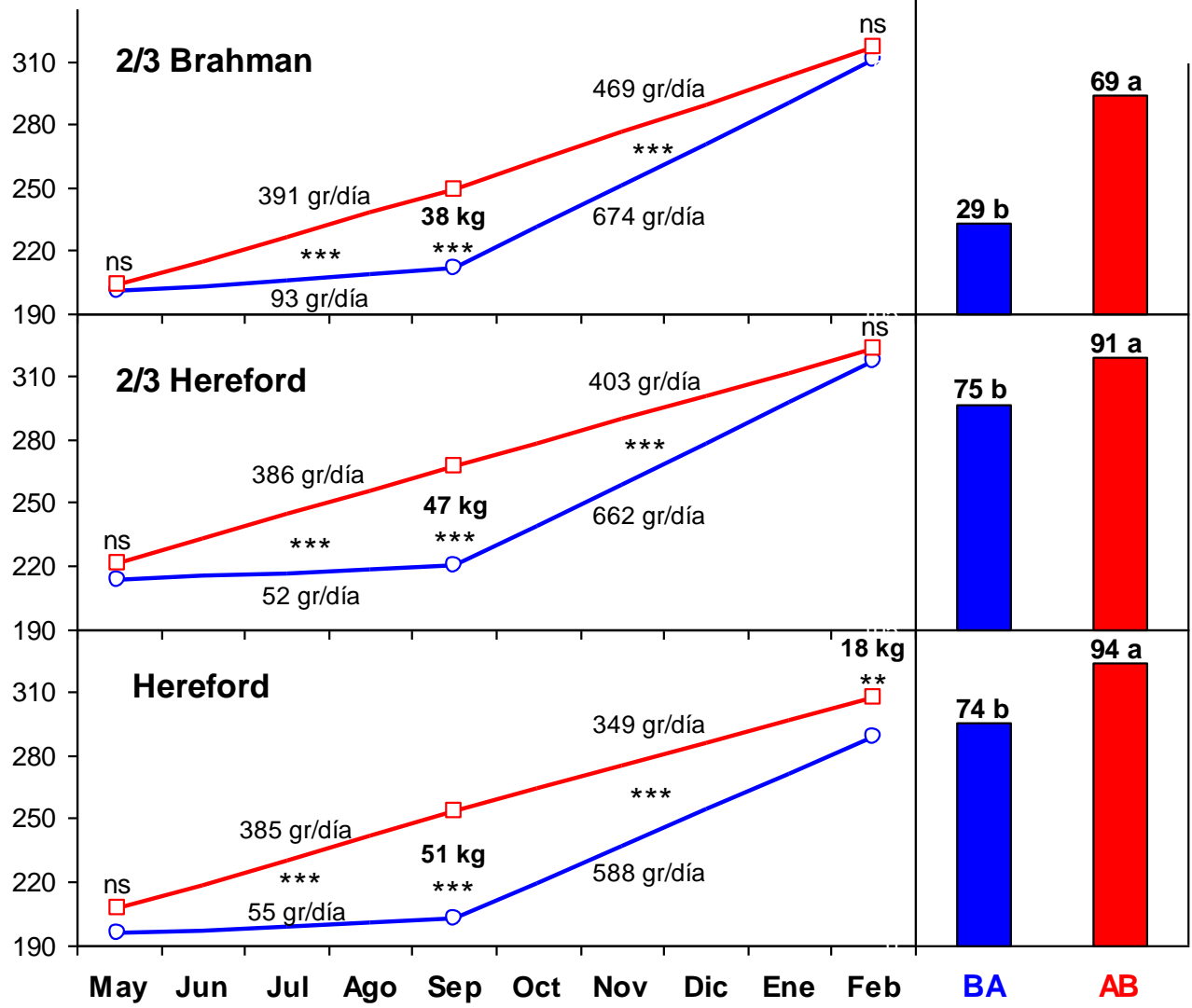
Because it has been seen in different field experiments that affects future reproductive performance.....



Low W- High S-S DLWG      High W- Low S-S DLWG

Live weight (kg)

Pregnancy Rate at 18m



Frick and Borges, 2003



Objective: evaluate contrasting daily live weight gain during winter (post-weaning) on reproductive performance in female calves (at 20 m old, autumn mating)

Material and methods:

49 females calves (8m, 196 kg):

**CON:** grazing native pastures (n=25)

**SUP:** grazing native pastures and supplemented during 90 days of winter (n=26)

Supplementation= 1.5% of LW (131g CP and 2.1MCal of ME per kg DM)

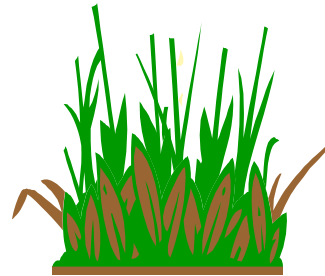
**ALL ANIMALS GRAZED TOGETHER DURING THE WHOLE EXPERIMENTAL PERIOD  
(ONE YEAR)**



Individual intake

# Pastures and Concentrate

- Native pasture: low protein (CP=8-9%), low digestibility (30-45%)



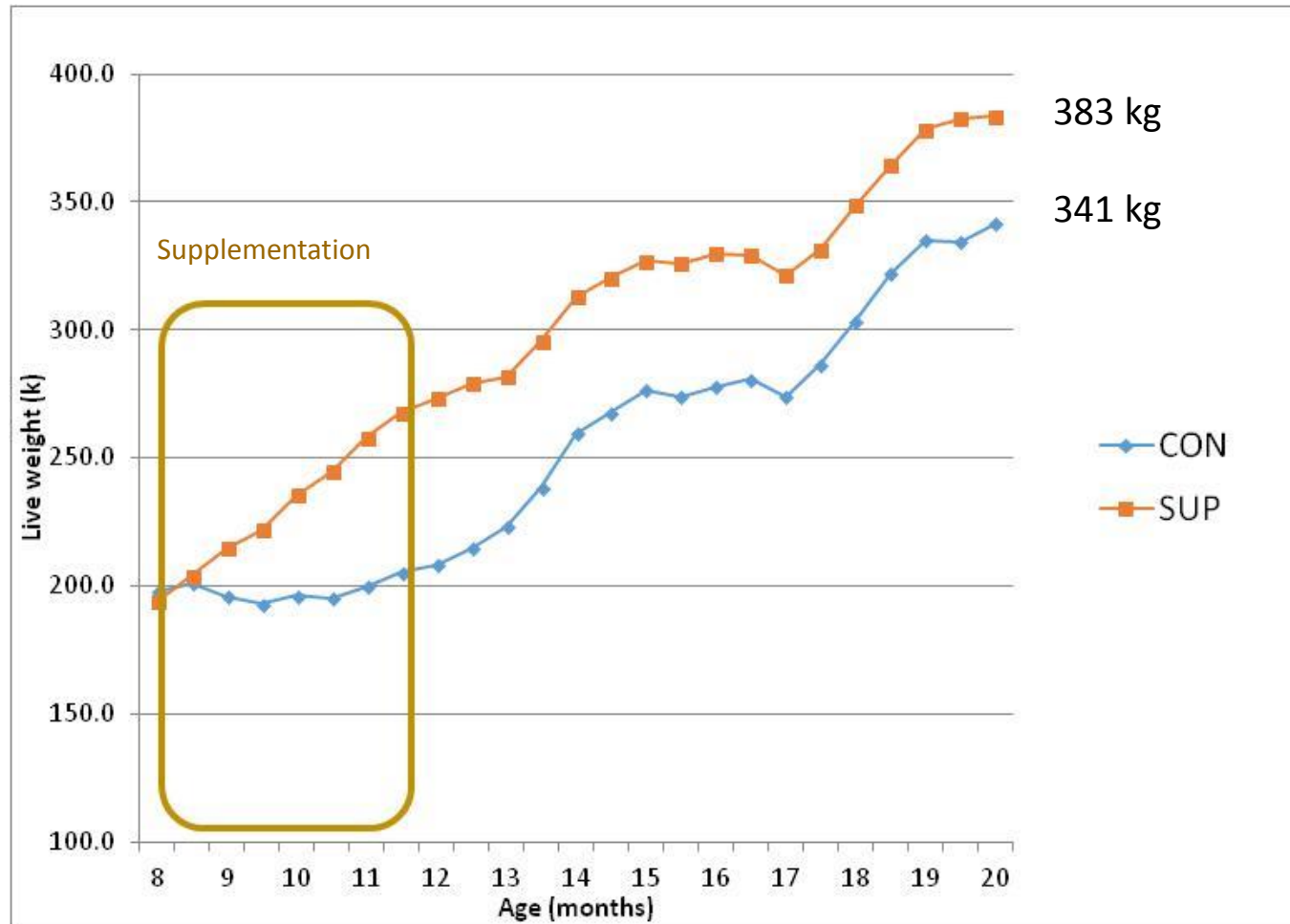
- Concentrate (1.5% LW, 3 kg/a/d) 16% of CP



# Results

- Live weight
- Daily live weight gain rate
- Pregnancy rate
- IGF-1 concentrations
- Discriminative analysis

# Live weight



Treatment \* day  $P < 0.0001$

# Daily live weight gain rate (kg/a/d)

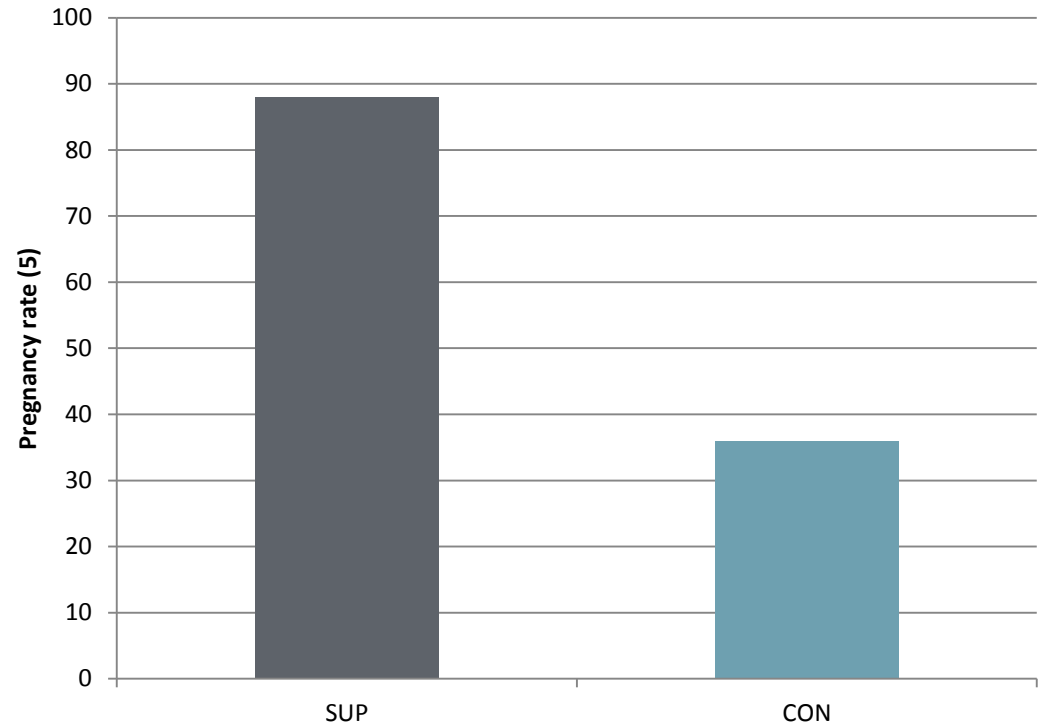
	CON	SUP	P
Winter	0.074	0.757	< 0.0001
Spring	0.758	0.601	<0.0001
Summer	0.331	0.247	0.0064
Autumn	0.217	0.216	0.9896

# Pregnancy rate

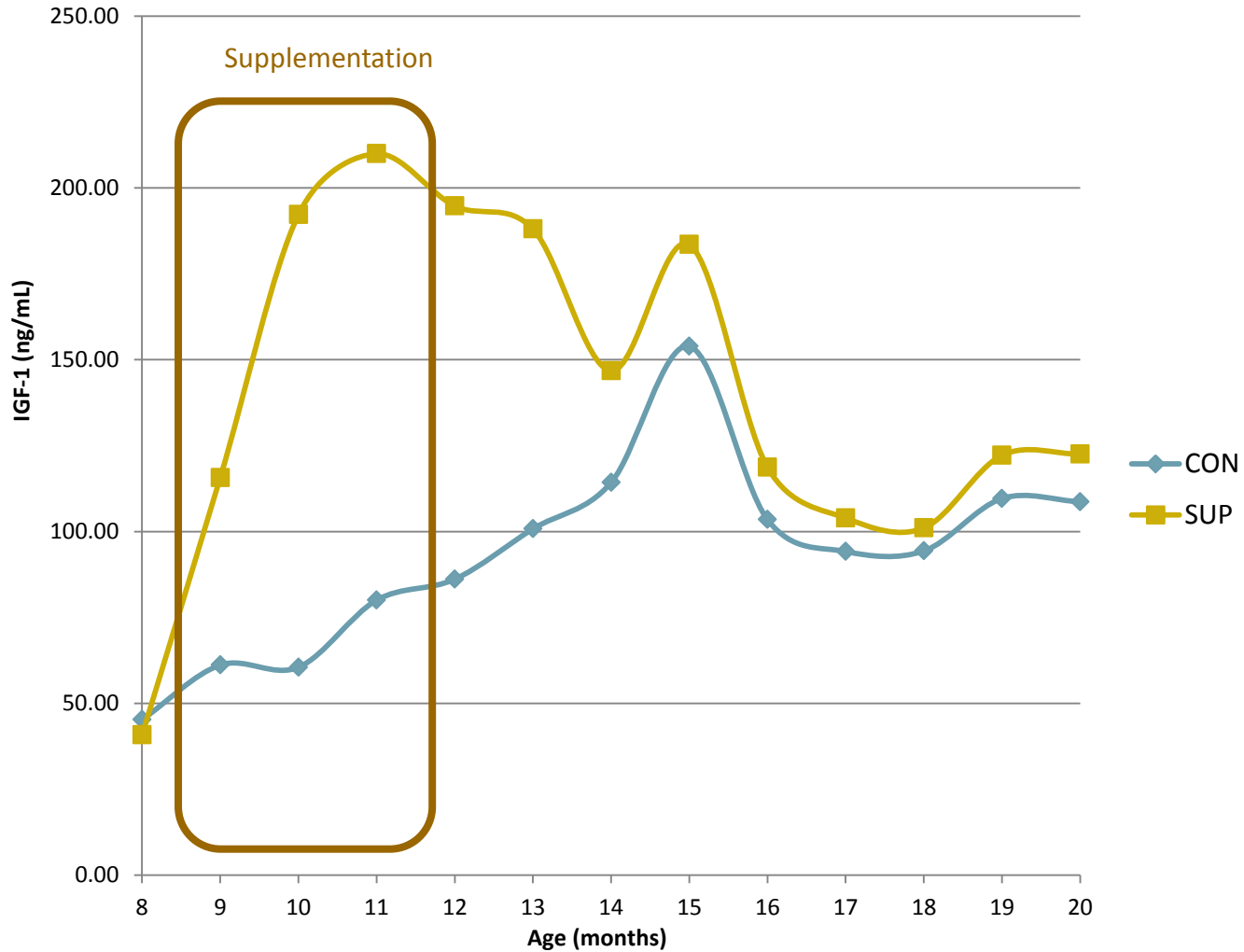
**SUP: 88 %**

**CON: 36%**

P<0.01



# IGF-1 concentrations



Treatment \* day  $P < 0.0001$



# Results of discriminate analyses for DLWG between pregnant and non pregnant heifers

Daily live weight gain (Kg/day)

	Wils' Lambda	Partial Lambda	F-remove	p-value	Tolerance
DLWG winter	0,965999	0,598305	29,54105	<b>0,000002</b>	0,479569
DLWG spring	0,651389	0,887277	5,58993	<b>0,022542</b>	0,559216
DLWG summer	0,633484	0,912355	4,22685	<b>0,045752</b>	0,799392
DLWG autumn	0,611874	0,944578	2,58167	<b>0,115262</b>	0,928469

# Possible mechanisms?

- Metabolic memory ?

# NUTRITION X REPRODUCTION

## Conceptual APPROACH

(Blache et al., 2006)

Insulin, IGF-1, leptin, GH, etc

Determines animal  
response to nutrition

Genetics

Communication  
network

Nutrition x reproduction

Metabolic status

Structural

Temporal  
dimension

≠ organs and tissues that relate  
metabolic status and  
requirements=

Brain – gonads-pancrea-liver-fat  
tissue

Intake

Body reserves

Expenditure

Dinamics effects

Metabolic memory

# Possible mechanisms?

- Metabolic memory ?

**Although heifers made compensatory live weight gain,  
is an inadequate environment in part of the  
development process (post-natal) able to modify  
the potential expression of reproductive  
performance?**

# Considerations

- Winter supplementation affects future reproductive performance
- In range conditions winter supplementation after weaning it is a technology adopted by farmers
- More research to understand the mechanisms underlying this process

Interaction between researchers, extensionists and farmers = sharing the knowledge



# Thanks to the people of our team



**Thanks!**

**Gracias!**

