

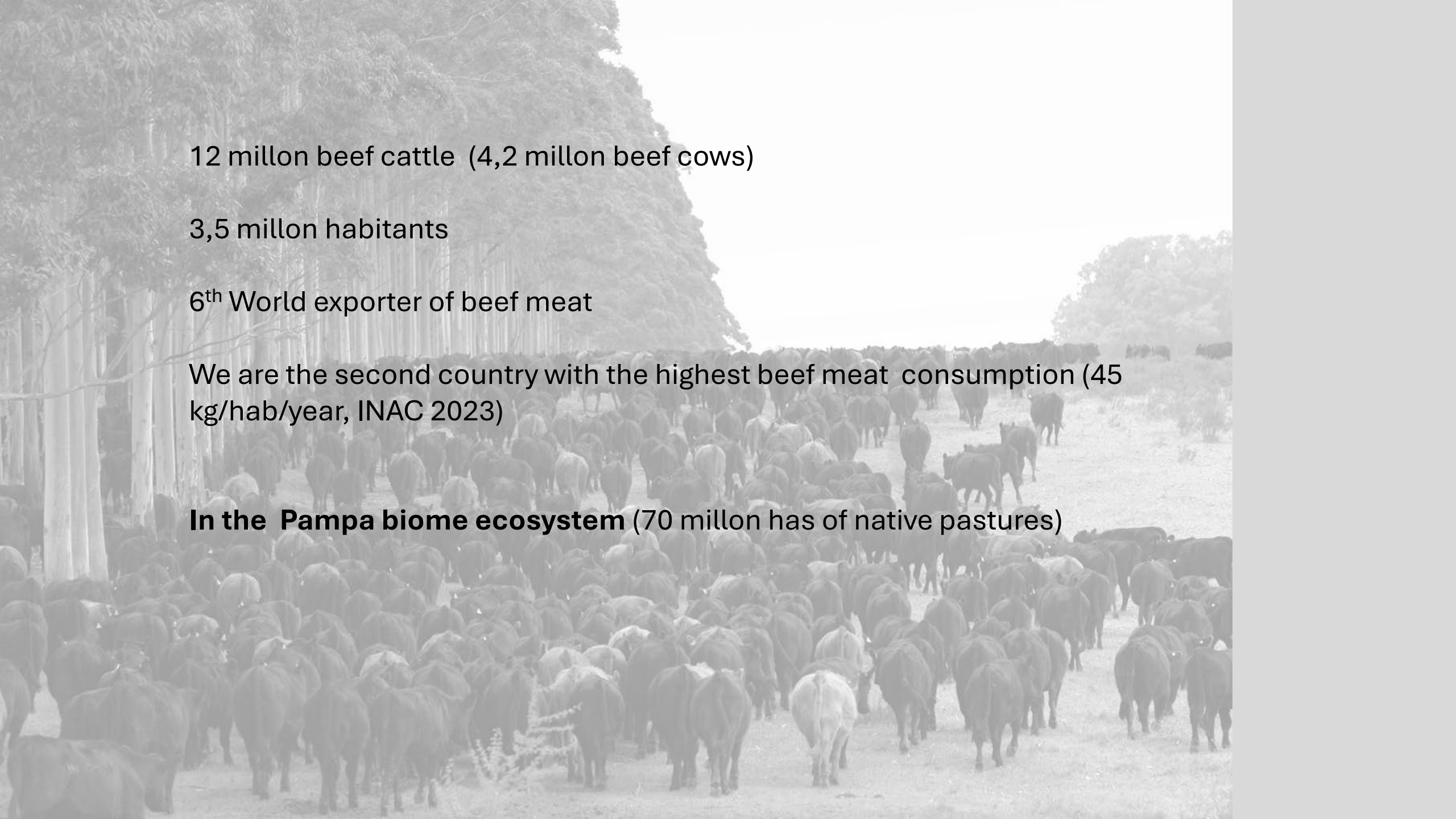
Effect of grazing pastures with rich tannin legumes on ovarian activity in suckling anoestrous beef cows

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Uruguay
a small country, a big farm



A large herd of cattle, mostly dark-colored, is gathered in a grassy field. In the background, there is a dense line of tall, thin trees, possibly eucalyptus, under a bright sky. The scene is slightly hazy or overexposed.

12 million beef cattle (4,2 million beef cows)

3,5 million habitants

6th World exporter of beef meat

We are the second country with the highest beef meat consumption (45 kg/hab/year, INAC 2023)

In the Pampa biome ecosystem (70 million has of native pastures)

Native pastures: high variation within year
and between years (rainfall dependent)







Drought spring summer 2022-2023



Flood autumn 2024

Background

Cow-Calves operations: need to increase and maintain good productive and reproductive parameters (ensure adequate income for the rural family) – Non subsidies



Low cost technologies, highly predictive/safe results, easy to apply



Ovarian activity diagnosis

- By ultrasonography
- At the beginning of mating/insemination period or in the middle
- In farms: all cows or a “representative sample”
- Identify 4 “classes”: Pregnant (embryo), Cycling cows (CL), Superficial Anoestrus (Maximum Follicle Diameter $\geq 8\text{mm}$), Deep Anoestrus (Maximum Follicle Diameter $< 8\text{mm}$)
- This tool predict pregnancy rate and help farmer to take management decisions (ejm: early weaning in deep anoestrous or temporary calf removal in superficial anoetrous)

Improved pastures with legumes: *Lotus subbiflorus* cv. “Rincón”



- Annual specie, commonly used in cow-calf operations (aprox 10-20% of total area)
- Production curve: highly concentrated production from August to December
- Great quality. In general crude protein level higher than native pastures. Tannins
- It offers very good seeding and very aggressive and persistent natural reseeding for many years with proper management
- If it is well managed, coexists in harmony with native pastures (not predominate or "smother" the natural pastures)



Spring 2023

Sown in 2002

General Objective

Evaluate the effect of *Lotus subbiflorus* during postpartum period on productive, reproductive and environmental parameters of beef cows



Materials and methods

- Experimental Unit Palo a Pique (INIA Treinta y Tres- Uruguay)
- 56 multiparous cows (Angus and HHxA) at 22 DPP assigned to:
 - i) Native Pastures (NP)
 - ii) Improved Pastures (native pastures with *Lotus subbiflorus*; IP)
- LW= 497 ± 6.8 kg; BCS= 4.05 ± 0.04 u (Scale 1-8)
- Initial forage allowance: 4.7 kgDM/kg LW
- End of the experiment at weaning (168DPP, march)

Materials and methods

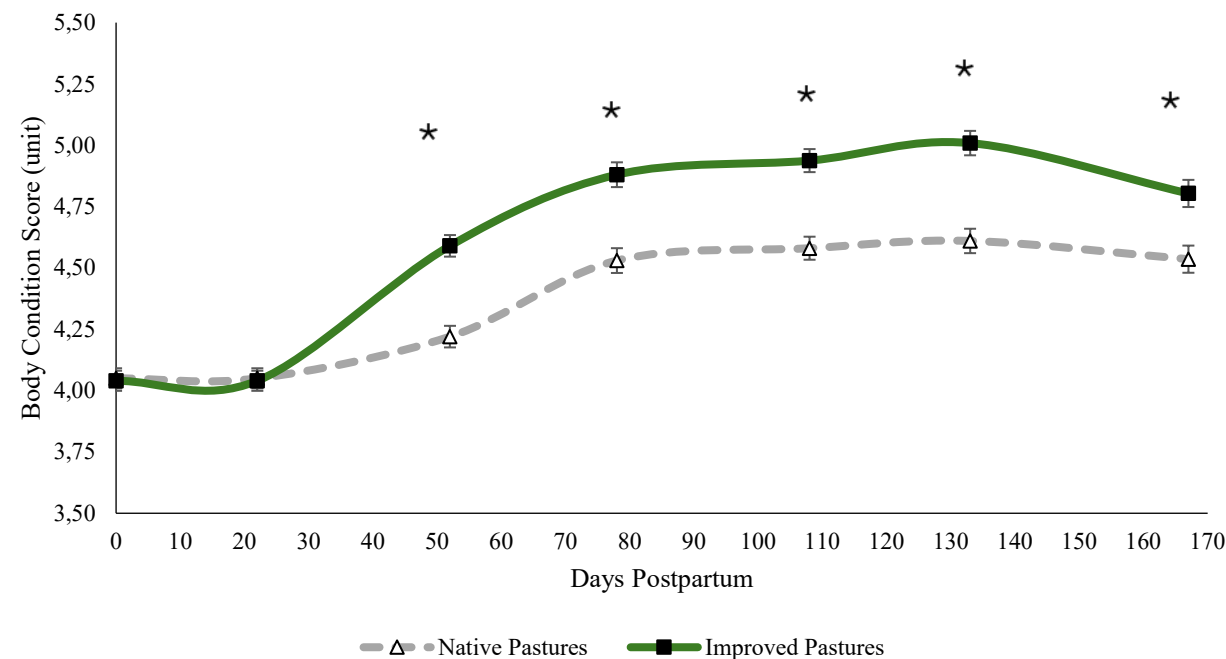
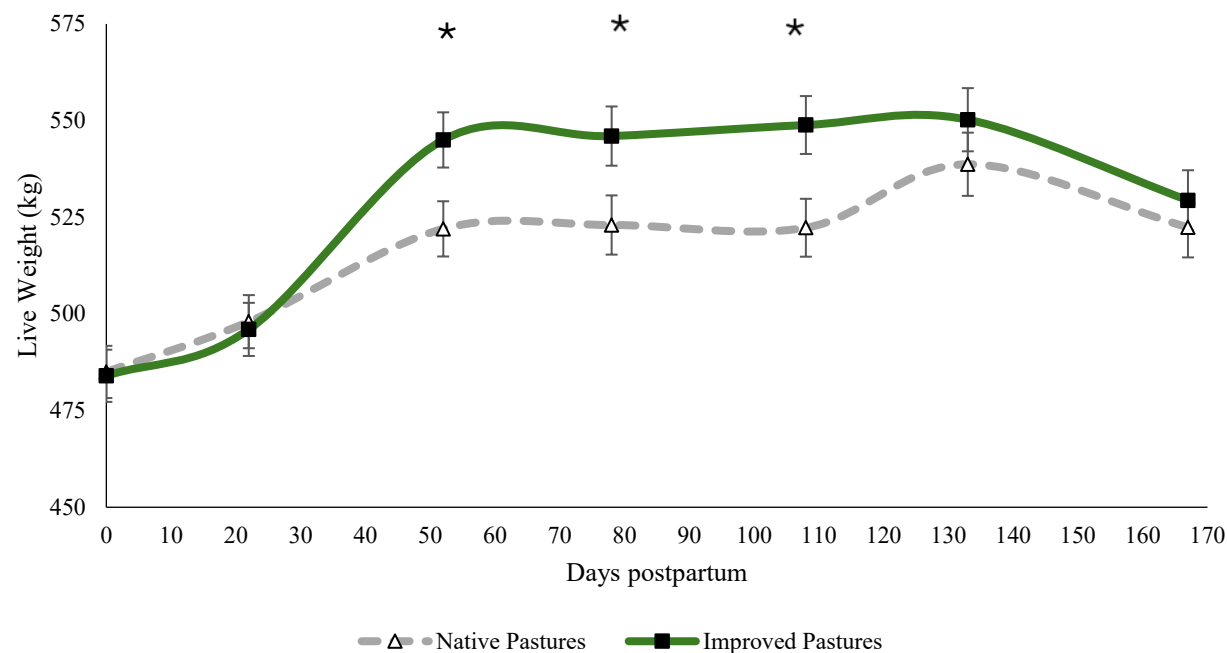
- LW and BCS every 28d
- Milk production every 14d until 90 DPP, every 28d thereafter (machine milking)
- Pastures availability and quality every 28d
- Ovarian Activity Diagnosis (OAD) at 60 and 90 DPP, pregnancy rate 45 days after the end of mating period

Pastures description



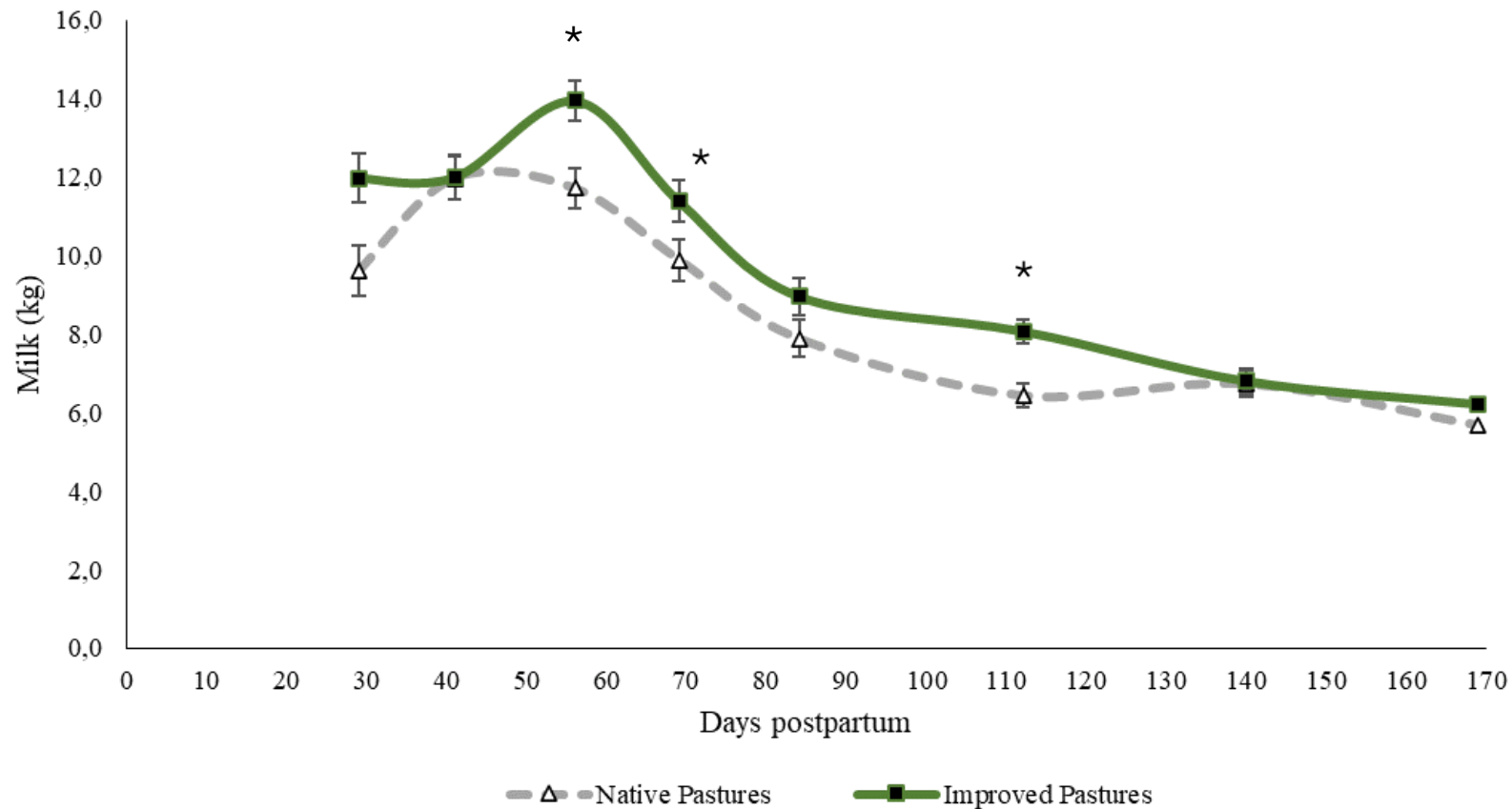
	Native pastures	Improved pastures
Forage availability (kgDM/ha)	1086	2765
Initial forage allowance (KgDM/kgLW)	4,7	4,7
Paddock size (hectares)	58	25
Stocking rate (cow/ha)	0,5	1,1
Tannins (%)	0,3	3,8

Cows body weight and body condition score (scale 1-8)



Mating period: from 73 to 136 DPP

Milk production and calves gain rate



Calves daily live weight gain similar : **1,075 k/a/d**

Weaning LW: **203 k**

Ovarian activity diagnosis and pregnancy rate

	Native pastures	Improved pastures	P
60 DPP			
Cycling (CL) (n/n; %)	5/28 (18)	0	0,97
Superficial anoestrous (MFD $\geq$ 8mm) (n/n; %)	16/28 (57)	24/28 (86)	0,02
Deep Anoestrous (MFD < 8mm) (n/n; %)	7/28 (25)	4/28 (14)	0,32
90 DPP			
Cycling (CL) (n/n; %)	26/28 (93)	25/28 (89)	0,64
Superficial anoestrous (MFD $\geq$ 8mm) (n/n; %)	2/28 (7)	2/28 (7)	1,00
Deep Anoestrous (MFD< 8mm) (n/n; %)	0	1/28 (4)	0,97
Pregnancy rate (%)	96	96	1,00

Final considerations

- Excepcional performance of cows on native pastures
- In the climate database, the spring-summer of 2023 was the best in the last 25 years (native pastures in their best expression).
(the national pregnancy rate was the highest record: 84%)
- Cows in both treatments were above the threshold of body condition necessary to achieve optimal reproductive performance
- Cows in Improved pastures achieved the same performance in half of the area

Effects of pastures with rich tannin legumes on ruminal environment and methane emissions of beef cattle

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Secondary products to the basal metabolism of plants, such as tannins, were identified as potential mitigators of methanogenic bacteria.

OBJECTIVES: We aimed the ruminal environment and methane emissions of beef suckling cows grazing native improved pastures with rich tannin legume (*Lotus subbiflorus*).

METHODOLOGY: 56 Aberdeen Angus×Hereford multiparous cows (LW 497± 6.8 kg; BCS 4.05±0.04 units) were assigned to each of two treatments on day 22±0.82 postpartum.

Treatments:

- **NP: Native pasture** (1086 kg DM/ha; 58.8 ha)
- **IP: Improved pastures** (2765 kg DM/ha; 23.5 ha)

Measurements:

- Rumen environment using ororumenal sampling.
- CH₄ emissions by GreenFeed systems (C-Lock Inc. USA).



RESULTS:

No differences were observed in pH (5.9), total VFA (98 mM), Propionate (28.6%) and Butyrate (11.7%), but cows IP presented lower Acetate (56.1 vs 57.9%) and higher NH₃ content (10.0 vs 7.72 mg/dL) respect to NP (p < 0.05).

Methane production was higher in IP than NP, but the intensity (g/kg LW cow + calf) was lower (Table).

	NP	IP	EEM	P
g CH ₄ /d	296	359	11.3	<0.001
g CH ₄ / kg LW Cow + Calf	220	171	17.4	0.05

Conclusions and implications

- Natives pastures improved with 27% of rich tannin legumes reduced ruminal Acetate and intensity of emissions of beef cattle cows.
- The *Lotus subbiflorus* is possible nutritional strategy to reduce methane emissions in rangeland systems.

Effect of pastures with rich tannin legumes on milk production and beef calves' performance

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OBJECTIVES:

The aim of this study was to evaluate cow's milk production, and beef calves' performance grazing native improved pastures with a rich tannin legume (*Lotus subbiflorus*).

METHODOLOGY:

Treatments:



Native Pastures

58.8 Ha
28 Angus×Hereford multiparous cows
496±12 Kg
1.086 kg DM/ha



Improved Pastures

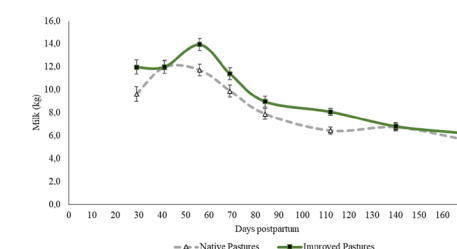
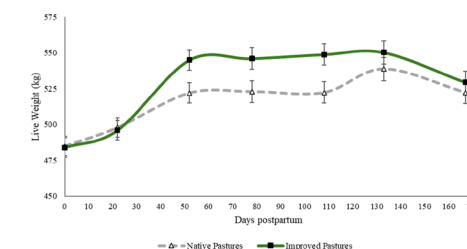
23.5 Ha
28 Angus×Hereford multiparous cows
504±12 Kg
2.765 kg DM/ha

Measurements:



- Milk yield was measured biweekly until day and monthly until weaning using a milking machine after oxytocin injection.
- Cows and calves LW was assessed every 28 days

RESULTS:



- Calves daily live weight gain was similar in both treatments (1.075 Kg/day).
- Cows live weight was higher in improved pastures than in native pastures at 52, 78 and 108 days postpartum (P<0.05)
- Average milk production was higher in Improved Pastures than in Native Pastures cows from Day 30 to 84 postpartum (12.3 vs 10.8; P<0.005) and from Day 84 to Day 140 postpartum (8.8 vs 7.7, P<0.05).

Considerations

- Cows managed in improved pastures during postpartum period increased body live weight and milk production, but it was not expressed in calves daily live weight gain
- Under grazing conditions, the incorporation of *Lotus subbiflorus* on native pastures is a nutritional and economical management strategy to increase postpartum beef herd performance.



Thanks our team in the Experimental Unit for taking care of animals and supporting the measurements



Thanks Ing. Luis Carrau (Uruguayan Society of Angus Breeding, SCAAU)



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U R U G U A Y

¡Muchas gracias!

