

Differences in feeding in stalls or at pasture may be linked to differences in feeding strategies : a meta-analysis



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Context

Pasture

Stalls

Cattle population
(millions of heads)

406

VS

29

Cattle production
(millions of tonnes)

14.6

VS

3.9



Cattle production. head⁻¹
(millions of tonnes.head⁻¹)

0.03

VS

0.13

FAO, 2009

Grass feeding, seldom with
supplements

VS

Diet with greater nutritional
density (protein and energy
supplements)



Pasture

VS

Stalls

Standing roughage

Outdoor

+ 21 % energy expenditure
(Kaufmann et al., 2011)

Lean carcass

VS

Mowed roughage or other
(silage, TMR....)

VS

Shade

VS

Low energy expenditure

VS

Fat carcass

Objectives of the meta-analysis

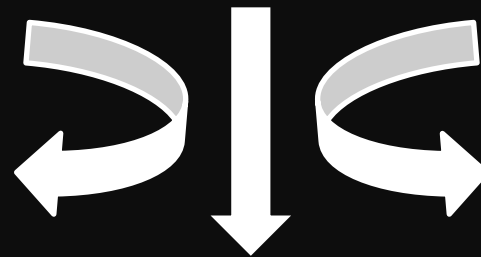
- Provide an overview of the differences reported between the 2 feeding environments (FE) on ADG of CATTLE and SMALL RUMINANTS
- Determine which factors (animal species, physiological stages, sex, complementation strategies) influence the differences between the 2 FE

Process of selection of the publications comparing ADG between stalls and pasture

1304 references
(CAB : 885; WOS: 419)

≈ 100%

Complete article not
available

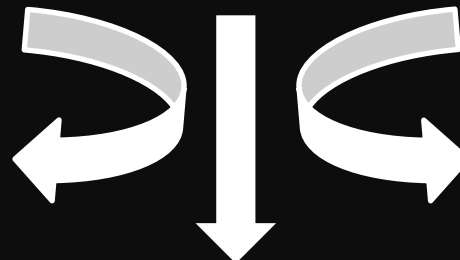


Stalls and pasture FE not
conducted at the same time

111 journal articles

≈ 8%

No ADG
measurements



Aberrant data

108 journal articles

- 116 experiments
- 399 treatments

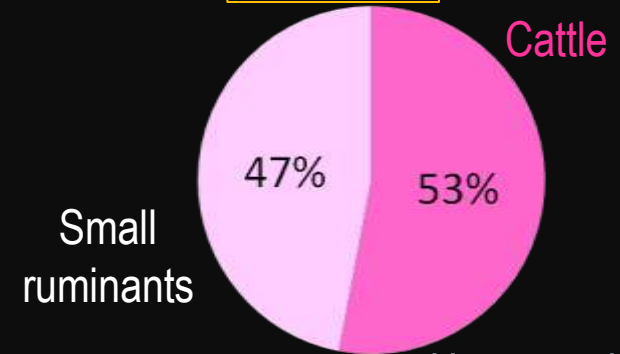
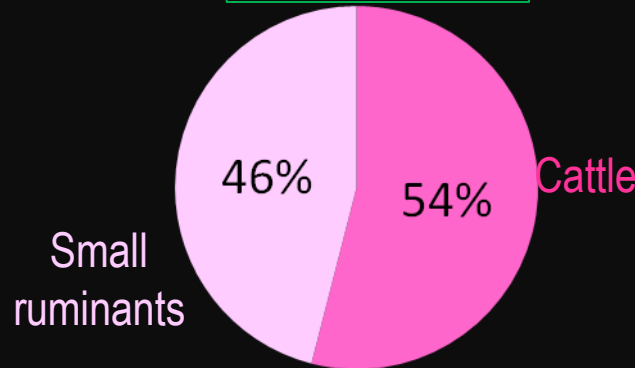
Description of the database (meta-design)

Pasture

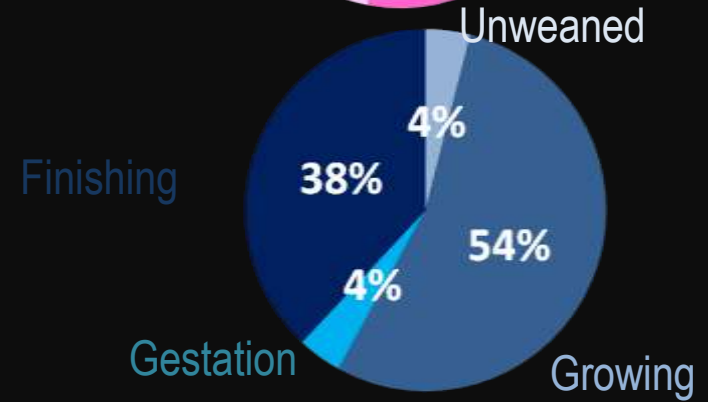
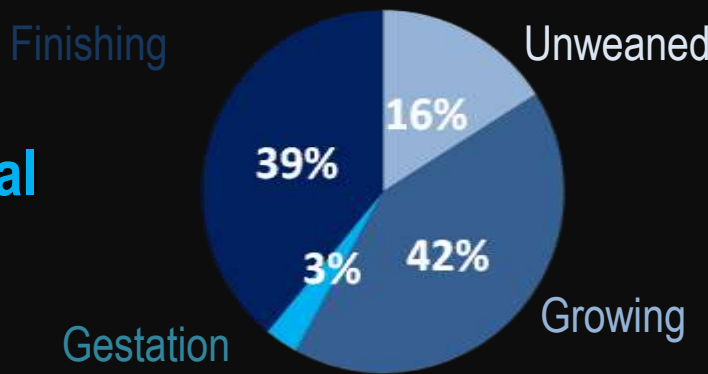
(% of treatments)

Stalls

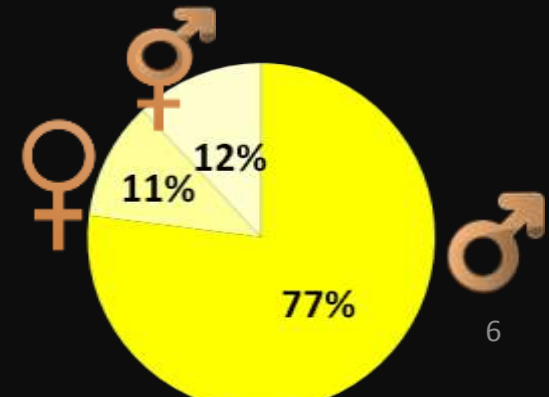
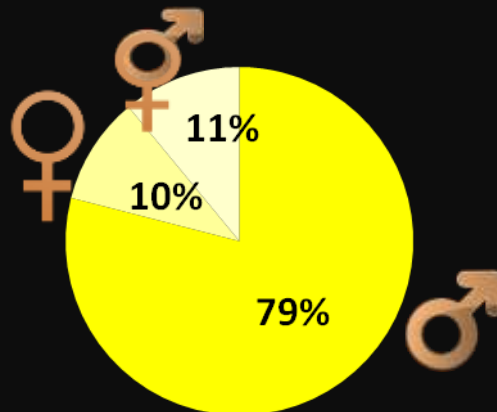
Animal species



Physiological stages



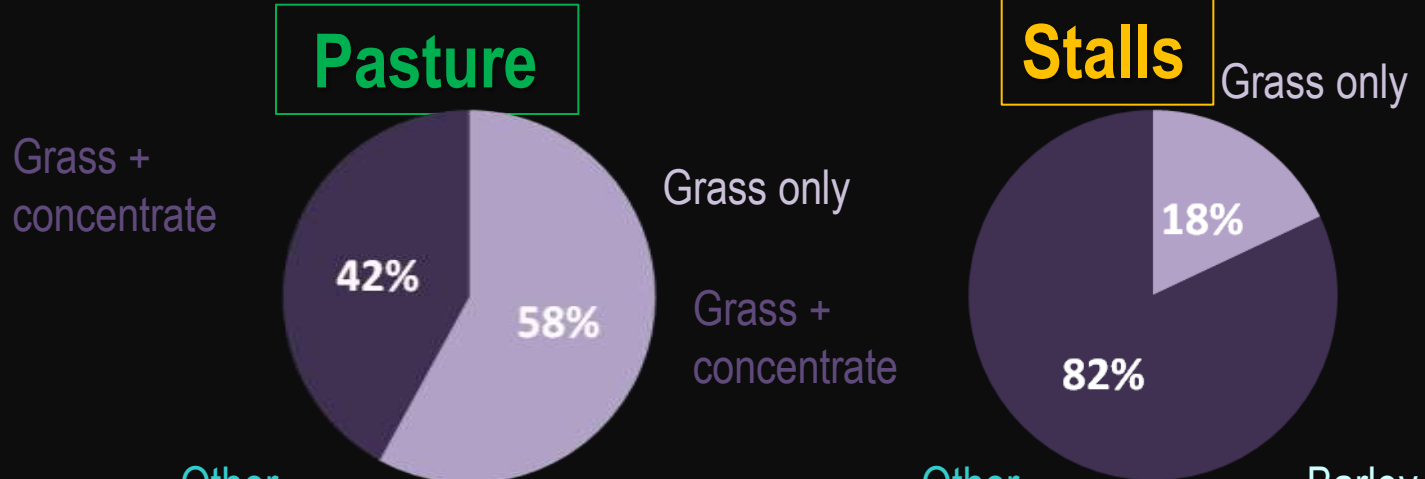
Sex



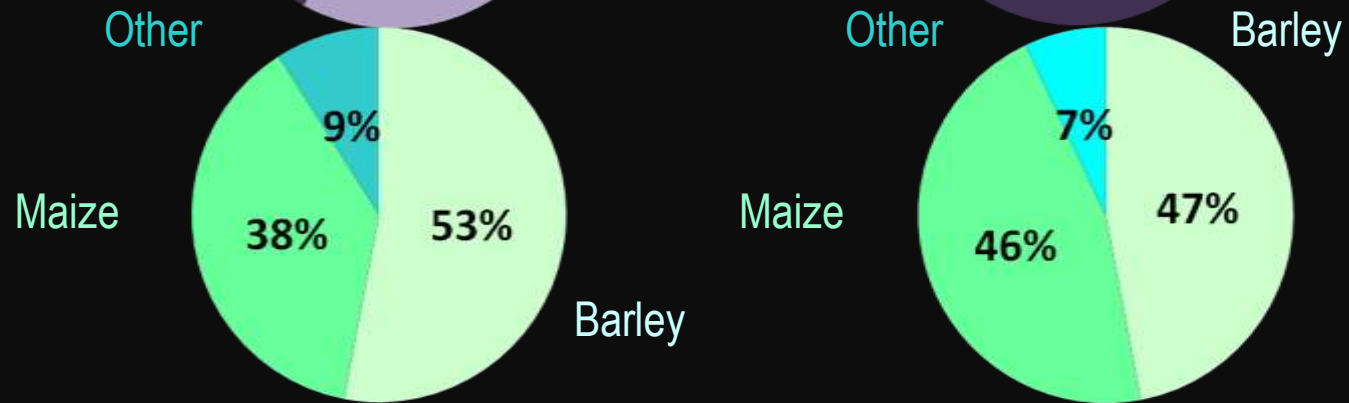
Potential confounding factors

Qualitative modalities of complementation

① **± concentrate in the diet**



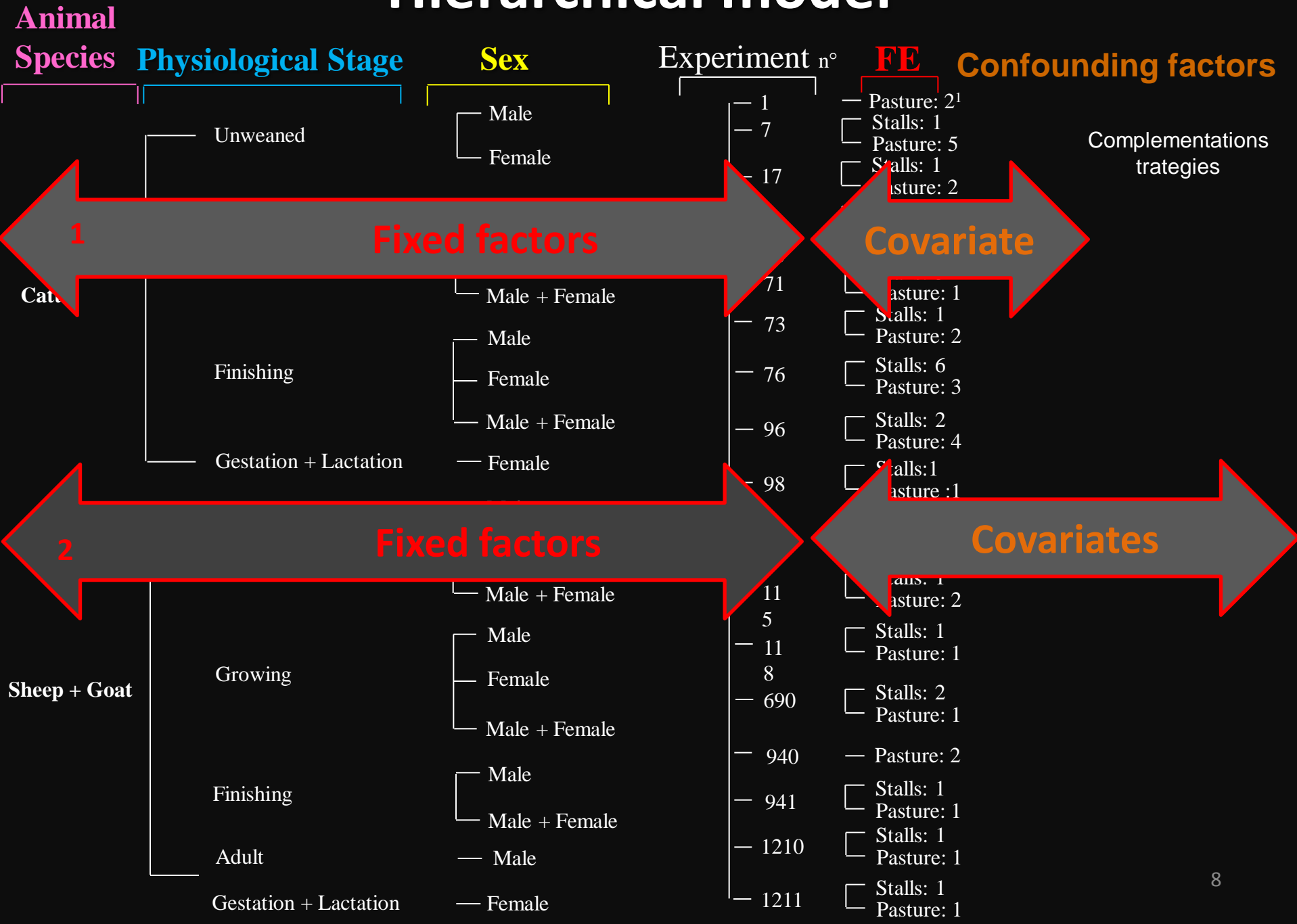
② **Nature of the concentrate**



Quantitative modalities of complementation

③ % of concentrate in the diet	19.4	61.88
④ (%)	± 18.3	± 25.22
Quantity of concentrate in the diet	6.8	12.4
(g DM.kg LW ⁻¹)	± 4.7	± 5.0

Hierarchical model



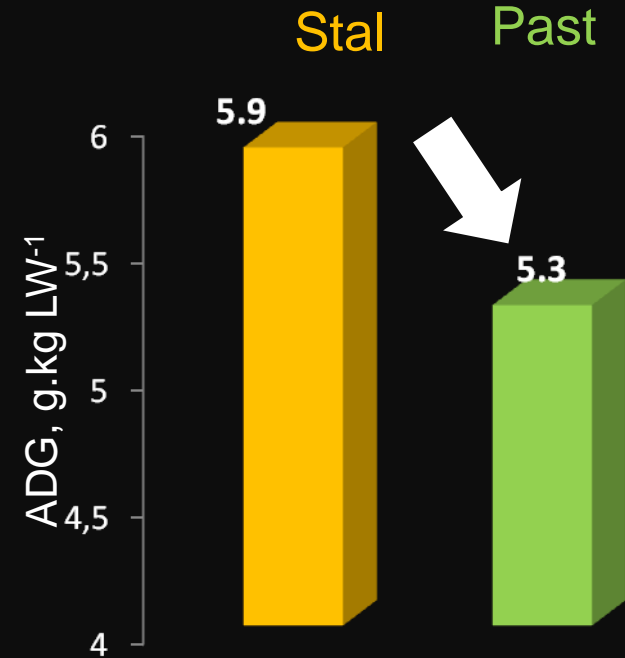
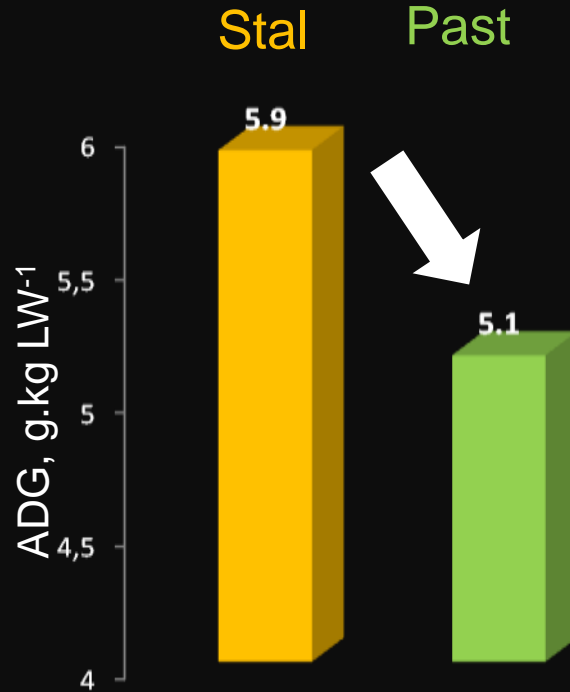
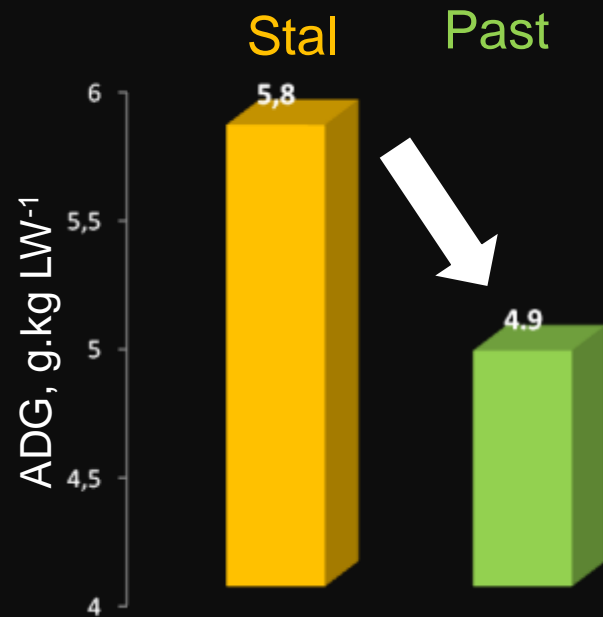
Effect of FE on ADG

Qualitative confounding factors

FE

FE ± concentrate

FE + nature of the concentrate

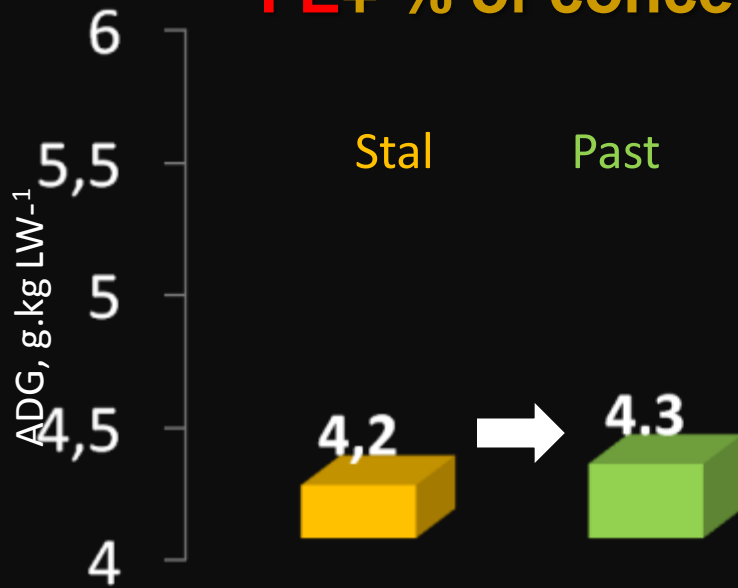


Stalls animals had a greater ADG

FE effect remained significant

Quantitative confounding factors

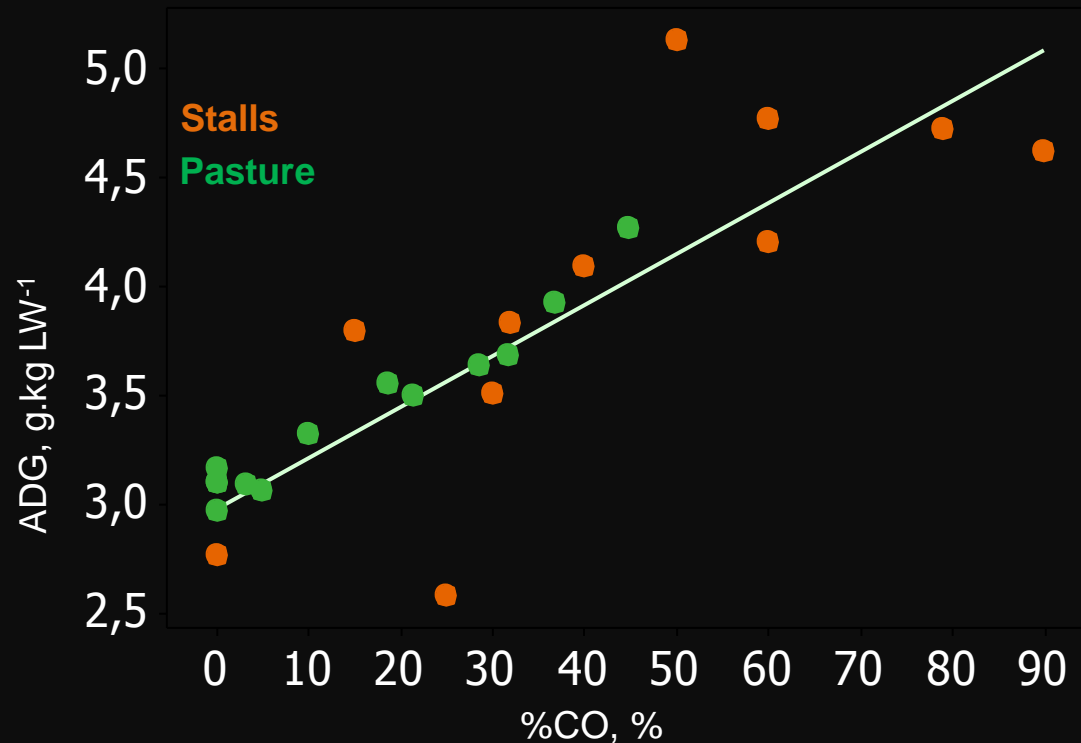
FE+ % of concentrate



No more effect of FE

$$\text{ADG} = 2.98 + 0.08 \text{ FE} + 0.023 \text{ PCO}$$

(nexpe = 10; ntreat = 24;
 $r^2 = 99.43$; RSD = 0.48)



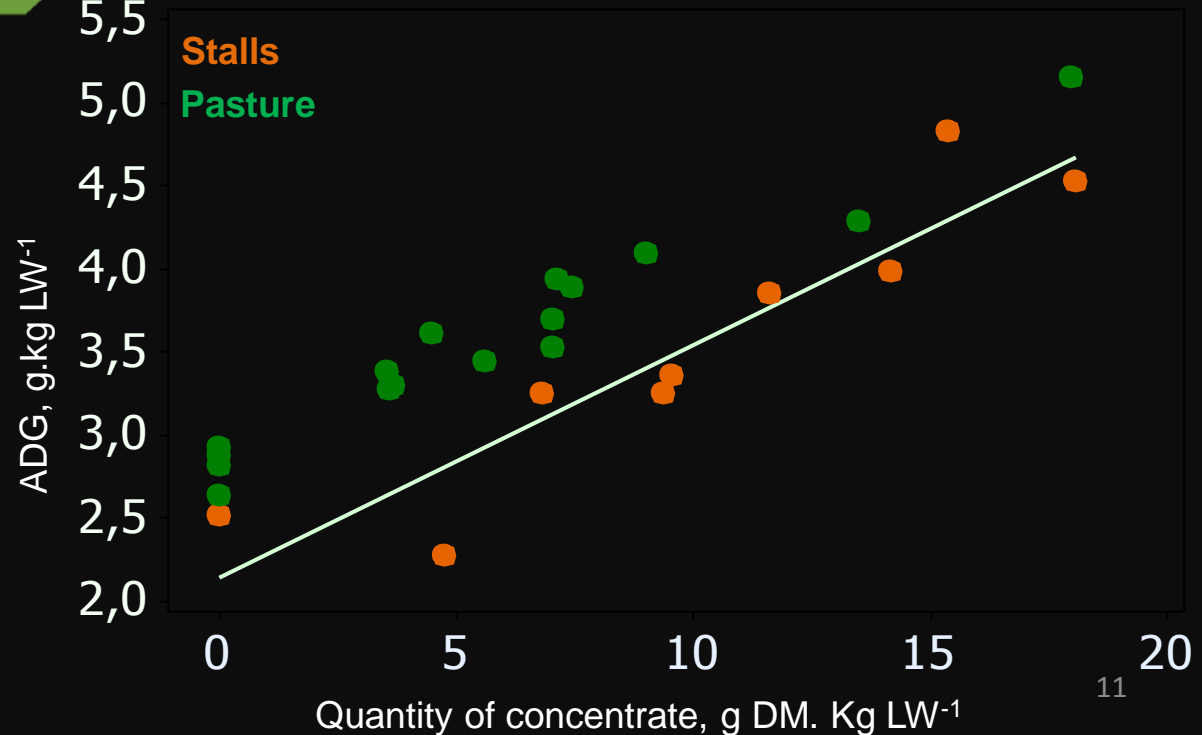
FE+ Quantity of concentrate



No more effect of FE

$$\text{ADG} = 2.24 + 0.58 \text{ FE} + 0.13 \text{ QCO}$$

(nexpe = 10; ntreat = 25;
 $r^2 = 99.77$; RSD = 0.29)



Conclusion

Pasture

Stalls

FE
Qualitative factors
FE ± concentrate
FE + nature of the concentrate

**Stalls animals grew faster
than grazing ones**

VS

No more effect of FE

Quantitative factors
FE + % concentrate
FE + Quantity of concentrate

Differences between feeding in stalls or at pasture appeared as mainly driven by complementation strategies

Grazing animals can possibly achieved the same performances as those fed in stalls, with leaner meat (Agastin et al., 2013, J. of Anim. Science)

Gap in knowledge:

Lack of studies on goat

Measurements on intake and digestibility at pasture

The same analyzes were conducted on carcass characteristics....

Thank you for your attention