

The effect of routine practices on the behaviour of beef cows according to their feeding managementK. Orquera¹, I. Ortigues-Marty², N. Thollon³, I. Casasús¹, B. Sepchar³ and A. De La Torre²¹*Ctr Invest y Tecnol Agroal Aragon (CITA), IA2 (CITA-Universidad de Zaragoza), Montañana 930, 50059 Zaragoza, Spain,* ²*INRAE, Université Clermont-Auvergne, Vet-AgroSup, UMRH, 63122 Saint-Genès-Champanelle, France,* ³*INRAE, Herbipôle, 63122 Saint-Genès-Champanelle, France; korquera@cita-aragon.es*

Animal behaviour can be modified in response to stimuli like weather conditions, social structure and farm management. The aim of this study was to determine if routine management activities such as weighing affected cow daily behaviour. Twelve 4 year-old lactating Charolais beef cows received a diet that met 100% of their nutritional requirements during lactation. From the second month post-calving, cows underwent feed restriction (4 to 10 d), with feed allowance reduced to meet 50% of their energy requirements (Challenge periods, CH), and then returned to full feed (Recovery periods, REC). This was repeated 3 times at monthly intervals. Cows were equipped with Medria[®] Axel loggers which recorded physical activity continuously during the study at 5-min intervals, providing the most dominant behaviour among five activities (ingestion, rumination, rest, over-activity and other). Cows were moved from their pen to a scale and weighed at 13:30 on some days (BW, n=17 d) but not on others (W0, n=17 d), equally distributed between CH and REC periods. The time devoted to the different daily activities was analysed with a mixed model (R Core Team, 2019) according to weighing (W0 vs BW) and feeding management (CH vs REC). Feeding did not influence ingestion time but affected both rumination (308 vs 473 min/d in CH vs REC, P<0.001) and rest (666 vs 402 min/d in CH vs REC, P<0.001). Only rumination time was longer in W0 than in BW days (406 vs 375 min/d, P<0.05), implying that weighing around midday interfered mostly with the time spent by cows ruminating. The effects of both factors on other and over-activity were less evident. These results should be considered in order to schedule routine management to avoid and/or minimise interference with cattle natural behaviour patterns.

Pasture feeding effects on α -tocopherol content and lipid oxidation of beef from late maturing bullsS. Siphambili^{1,2}, A.P. Moloney¹, E.G. O'Riordan¹, M. McGee¹ and F.J. Monahan²¹*Teagasc, Animal & Grassland Research and Innovation Centre, Grange, Dunsany, Co. Meath, Ireland,* ²*University College Dublin, School of Agriculture and Food Science, Belfield, Dublin 4, Ireland; sis39@aber.ac.uk*

The finishing of late-maturing bulls at pasture offers an opportunity to increase the economic efficiency of beef production. Compared to steers bulls have faster growth rates, higher feed efficiency and higher dressing out percentages, whilst grass is the cheapest feed resource available. The purpose of the study was to investigate the effects of the change from concentrate finishing to pasture finishing on fatty acid profile, α -tocopherol concentration and lipid oxidation of beef from late maturing bulls. 48 Charolais or Limousin sired bulls were assigned to one of four production systems: pasture only (P), pasture plus 25% dietary dry matter (DM) intake as barley-based concentrate (PC25), pasture plus 50% dietary DM intake as barley based concentrate (PC50) or a barley-based concentrate ration (C). Following slaughter at 19 months of age, 14 day aged *M. Longissimus thoracis et lumborum* samples were subjected to simulated retail display (4 °C, 1000 lux for 12 h out of 24 h) for 3, 7, 10 and 14 days in modified atmosphere packs (MAP, O₂:CO₂; 80:20). There were higher muscle concentrations of C18:3n-3 (P<0.001), C20:5n-3 (P<0.001), C22:6n-3 (P<0.01), total n-3 polyunsaturated fatty acids (PUFA) (P<0.001) and high highly peroxidisable polyunsaturated fatty acids (HP-PUFA) (P<0.01) in P, PC25 and PC50 compared to C bulls, respectively, but total PUFA content did not differ. There was higher concentration of α -tocopherol (P<0.001) in muscle from P compared to C bulls. α -Tocopherol decreased significantly (P<0.001) in all samples by day 14. Lipid oxidation was higher (P<0.01) in muscle from C compared to P bulls on day 10 and day 14. Finishing bulls on pasture increases the HP-PUFA concentration in muscle from late-maturing bulls but this does not result in increased lipid oxidation due to higher α -tocopherol concentration compared to muscle from concentrate finished bulls. In conclusion, finishing bulls on pasture does not reduce the shelf life of beef compared to beef from concentrate finished bulls.

Session 08. Physiological basis of PLF technologies to infer on animal health, welfare and production efficiency in cattle

Date: Tuesday 1 December 2020; 13.45 – 17.30

Chair: Montanholi

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Book of Abstracts of the 71st Annual Meeting of the European Federation of Animal Science

Virtual Meeting, 1st-4th December, 2020



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INTRODUCTION

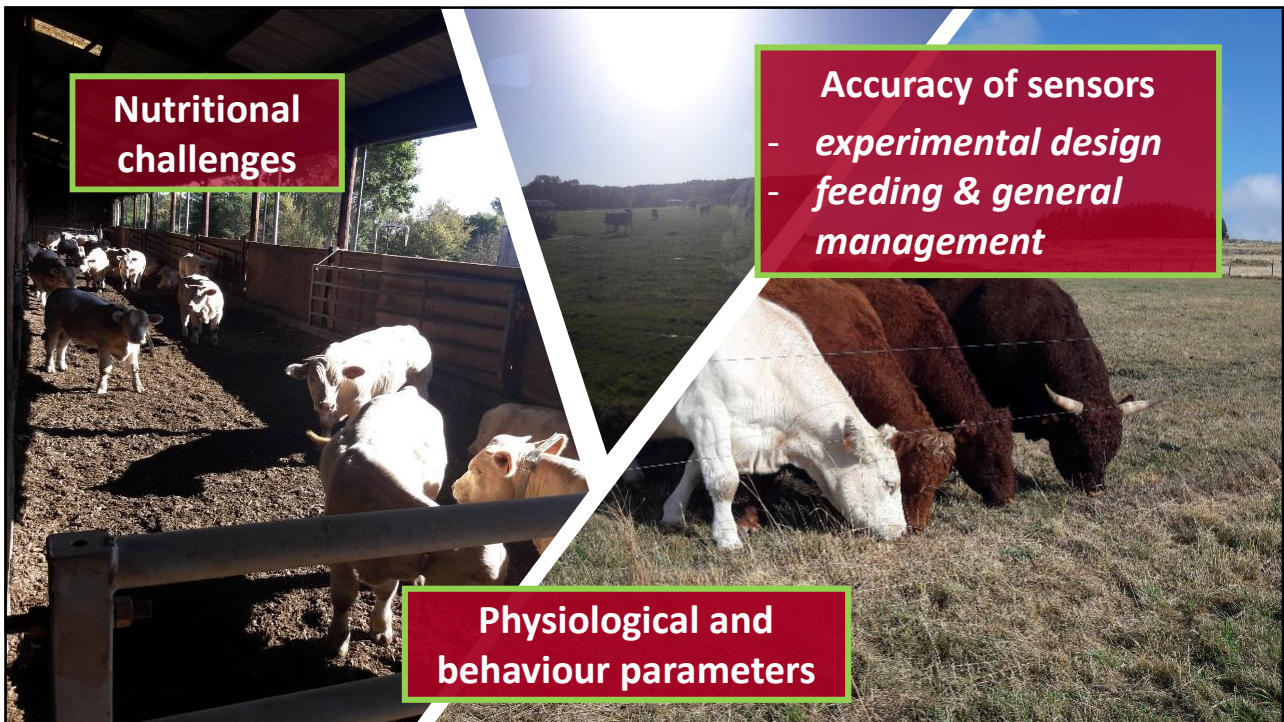


Conversion of resources into products

ROBUSTNESS



Changing environments



AIM



Components of efficiency and resilience of beef cows

- **Effect of routine weighing** of beef cows on their **behaviour patterns**
- Does this effect depend on the **feeding level**?

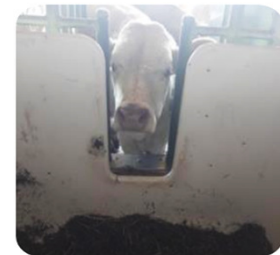


MATERIALS AND METHODS

- ❑ Laqueuille experimental farm
- ❑ Twelve 4 year- old Charolais beef cows
- ❑ Diets
 - composition:
 - hay (105 g CP/kg DM, 4.78 MJ NE lactation/kg DM)
 - concentrate (203 g CP/kg DM, 6.92 MJ NE lactation/kg DM)
 - formulated with INRAration software (cow weight, milk yield)
 - offered individually at 08:00, in individual troughs with automatic gates



INRAE



MATERIALS AND METHODS

Five nutritional challenges from the second month of lactation

	Period 1		Period 2		Period 3		Period 4		Period 5	
	Ch	Rec	Ch	Rec	Ch	Rec	Ch	Rec	Ch	Rec
n° days	4 d	17 d	10 d	18 d	4 d	3 d	4 d	3 d	4 d	10d

*periods
2, 4, 5
used in the
current study*

➤ FEEDING MANAGEMENT

Challenge (50% reqs.) vs. **Recovery** (100% reqs.)

➤ WEIGHING MANAGEMENT

cows moved from their pen and weighed at 13:30 on some days (**BW**) but not on others (**WO**)

Per. 2, 4, 5	
Ch	Rec
BW	BW
WO	WO

MATERIALS AND METHODS



AXEL accelerometer sensors and data logger

Raw data every 5 minutes

Database > 100000

5 activities

- Ingestion
- Rumination
- Rest
- Over-activity
- Other activities

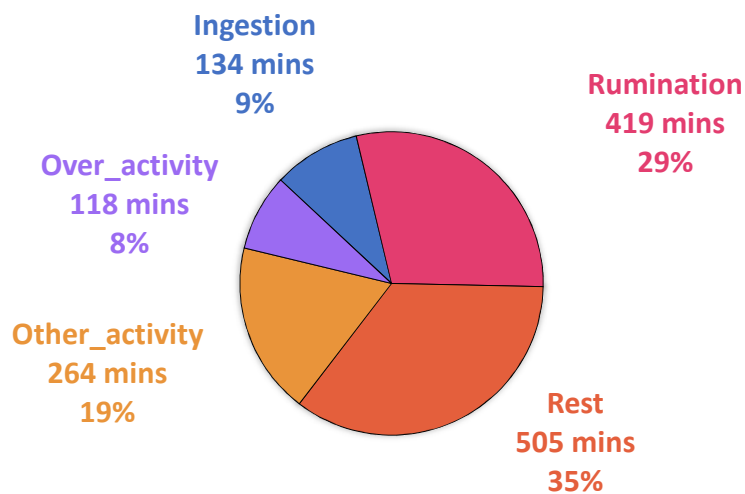
➤ **Statistical analyses:**
linear mixed models
daily time dedicated to each activity
n=34 days

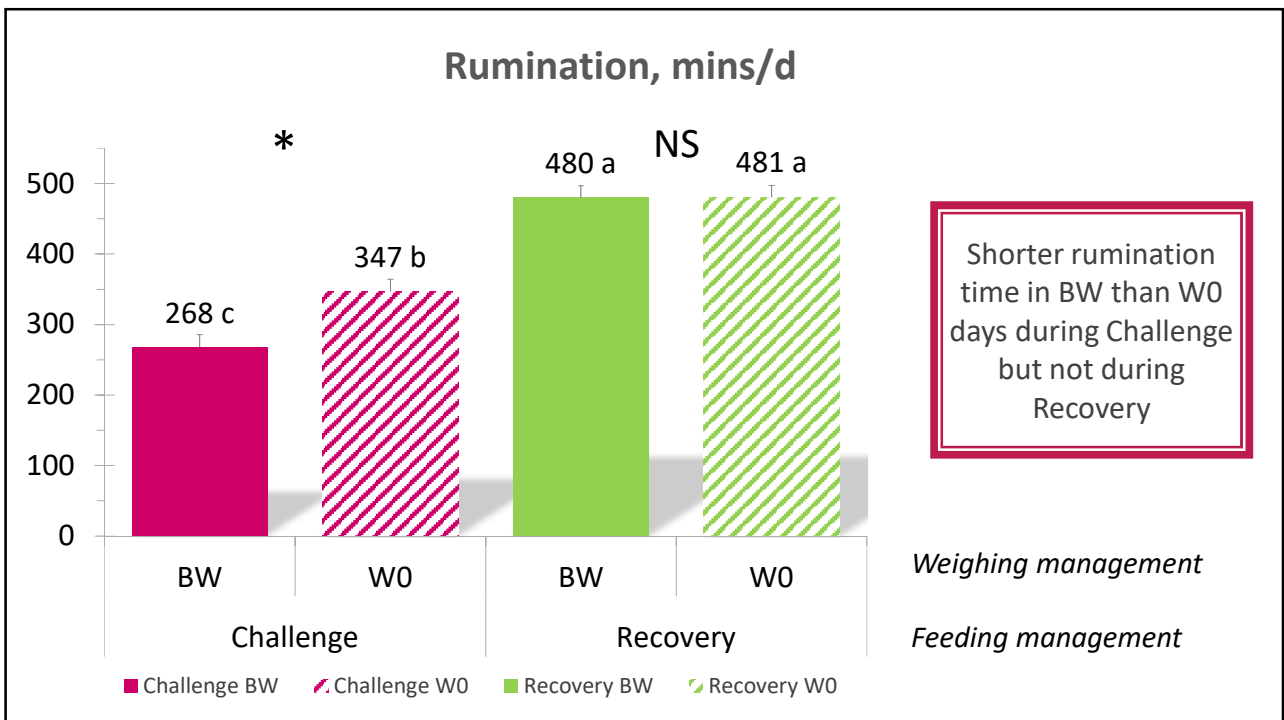
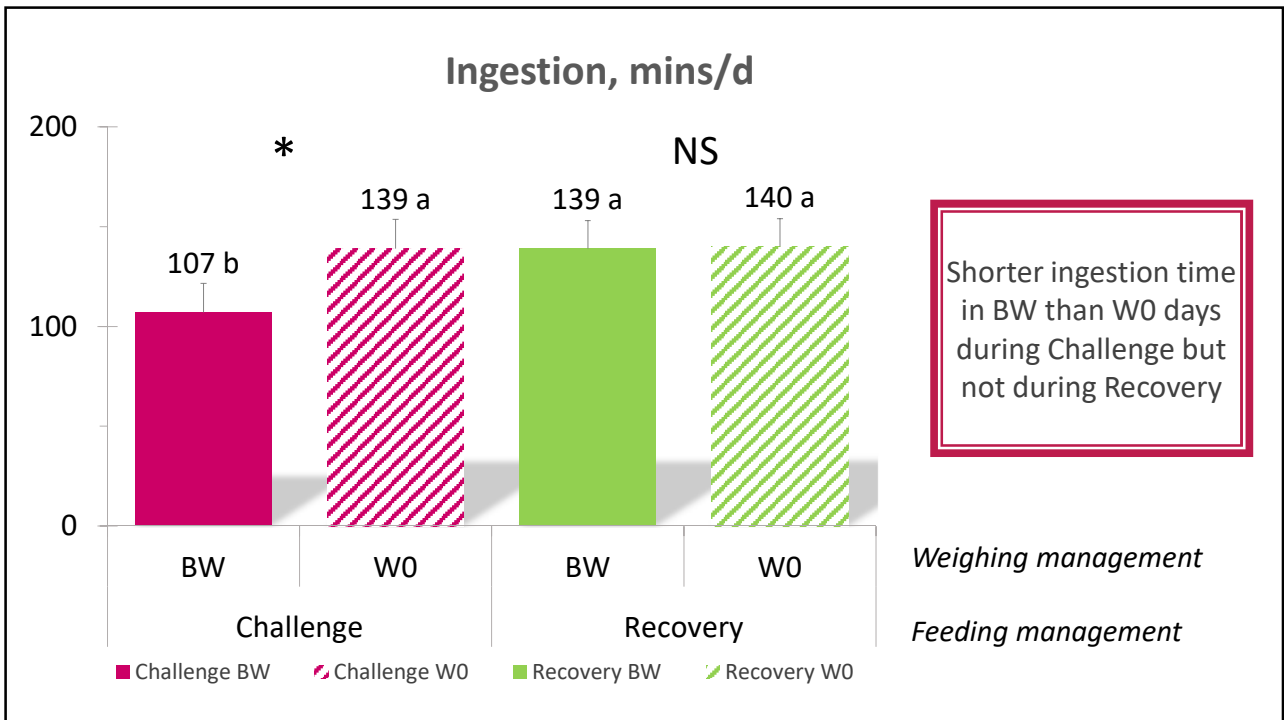
- Fixed effects:
 - Feeding management -> **Challenge** vs. **Recovery**
 - Weighing management -> **BW** vs. **W0**
 - Period -> **2, 4, 5**
- Random effect: cow



RESULTS

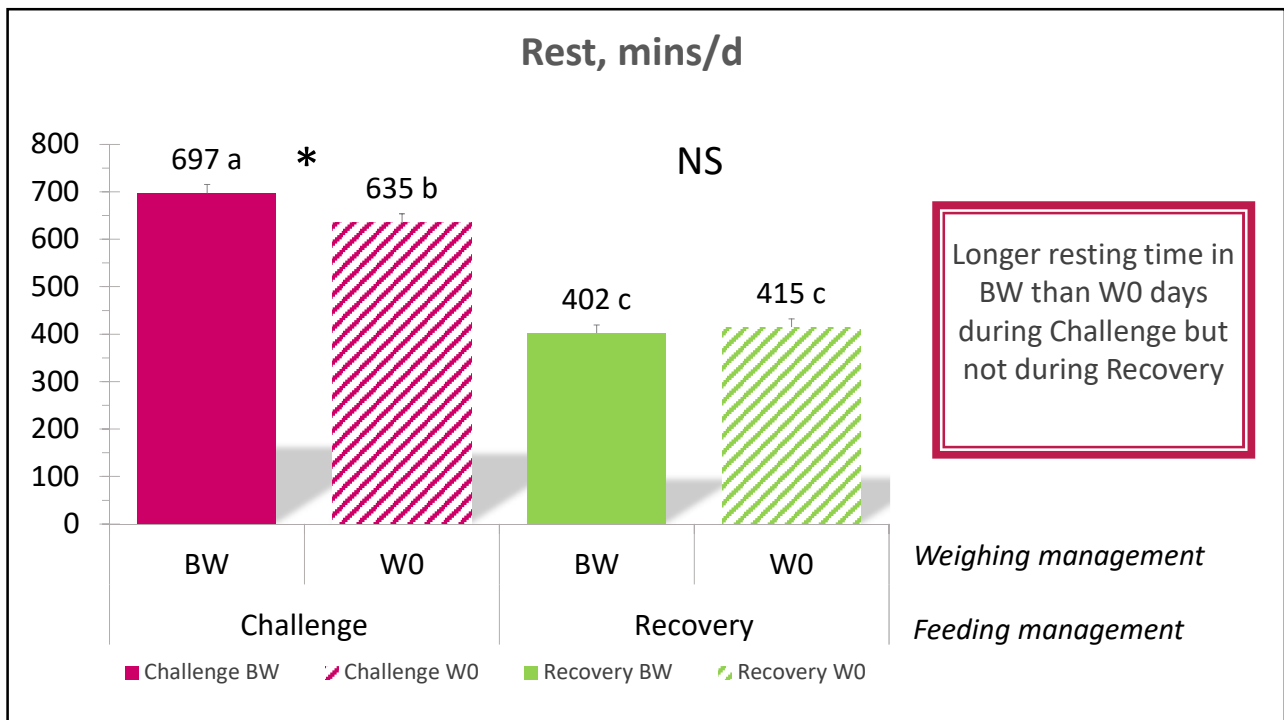
Daily activity budget

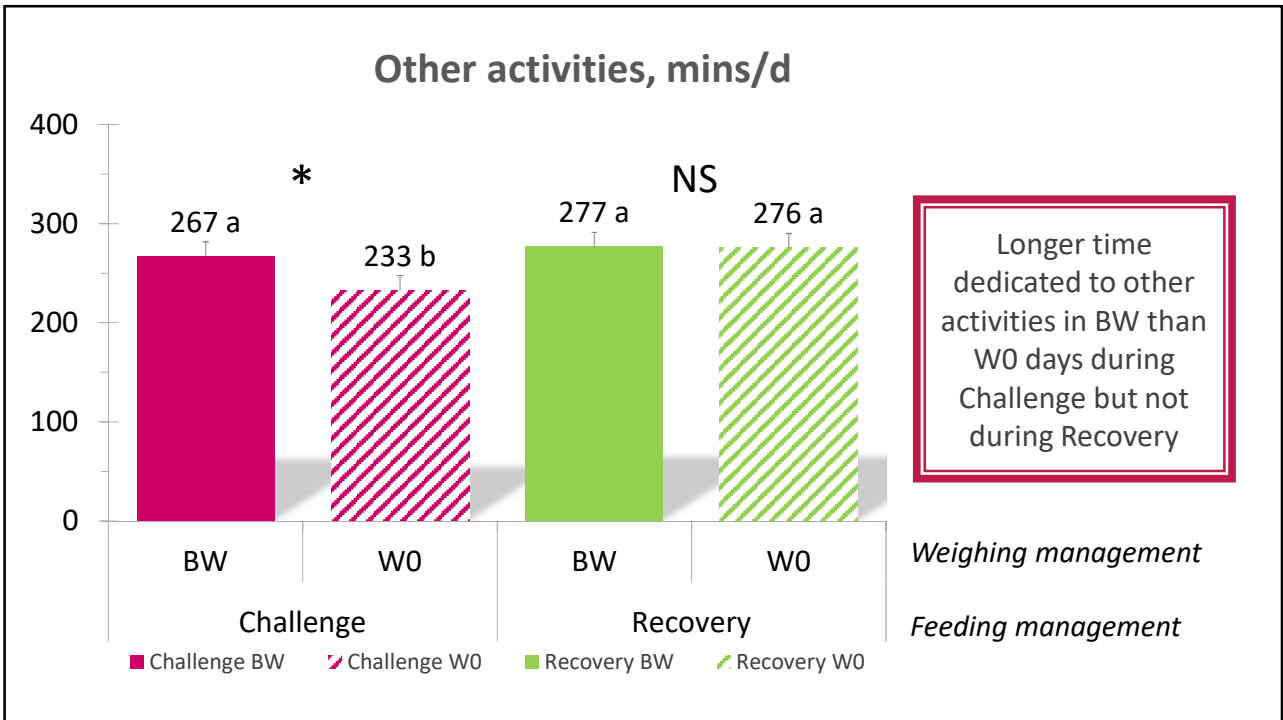
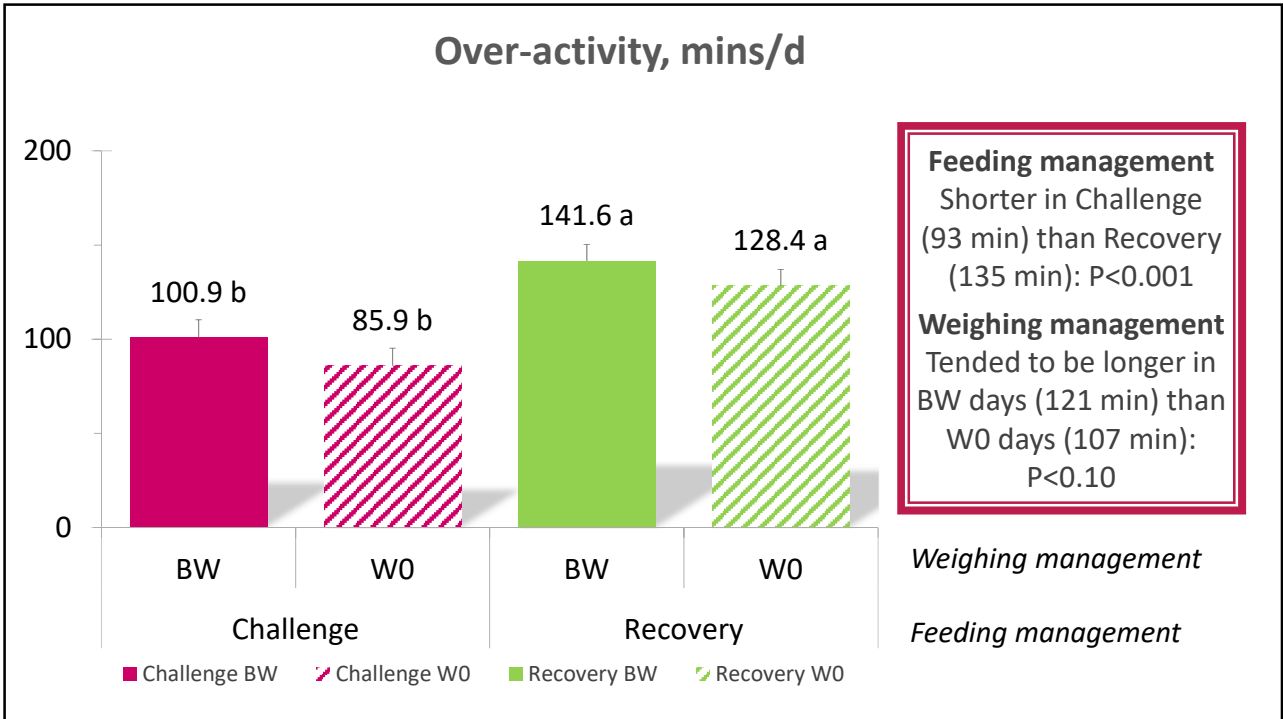




Moving the cows from their pens to the scale and back, had a clear effect both on intake and rumination when feed was restricted to 50% but not when the diet met 100% of requirements.

During the CH phase, on these BW days cows seemed to speed up both eating and ruminating, as compared to W0 days.





***On BW days during the CH phases,
the time saved from faster eating and rumination
was spent in longer resting and other activities,
as compared to days W0.***

CONCLUSIONS



Weighing around midday interfered mostly with the time spent by cows **eating, ruminating and resting**, but only when **feed intake was restricted**.



The effects of both factors on **over-activity** and **other activities** were less evident.



These findings should be taken into account in order to **schedule routine management** to avoid and/or minimize interference with cattle natural behaviour patterns.



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Thanks for
your attention

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DE ARAGON