Resilience to acute underfeeding in dairy sheep diverging in feed efficiency: 1) Milk yield

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INTRODUCTION

- **Feed efficiency** (FE) is a ratio of intake to performance. Preceding studies suggest that more efficient lactating ewes seem to be those with higher milk yield, which has been associated to loss of rusticity.

- **Resilience** is understood in this context as the ability of an animal to revert quickly to previous performance after a perturbation.

Could the selection of high-yielding dairy ewes with higher FE negatively affect their resilience?
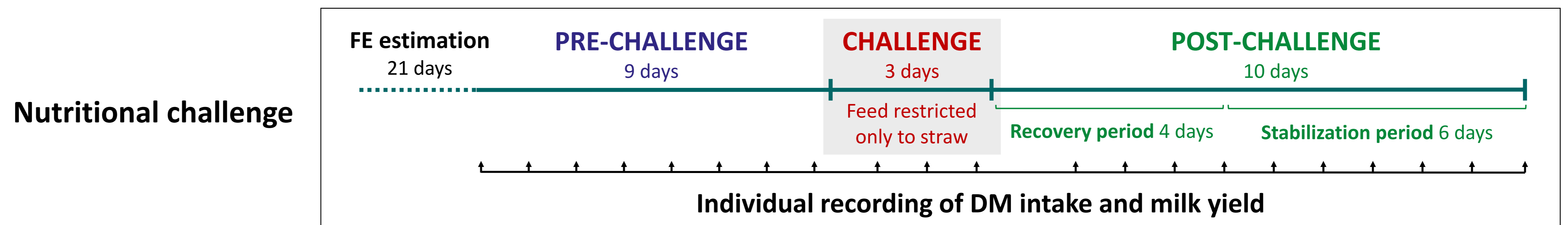
Aim: This study was conducted to examine the relationship between FE and resilience in high-yielding dairy ewes phenotypically divergent for FE.

MATERIALS AND METHODS

Experimental animals → 40 lactating Assaf ewes housed in individual pens and fed *ad libitum* a 50:50 TMR

FE estimation
Feed intake + dairy performance monitored over 3 weeks, and used to calculate:
Actual intake – predicted intake [based on net energy requirements for maintenance, production and weight change (INRA, 2018)]
Selection of
L-FE: least efficient ewes (n = 9)
H-FE: most efficient ewes (n = 9)

Nutritional challenge

FE estimation 21 days	**PRE-CHALLENGE** 9 days	**CHALLENGE** 3 days	**POST-CHALLENGE** 10 days
		Feed restricted only to straw	Recovery period 4 days Stabilization period 6 days

Individual recording of DM intake and milk yield

Statistical analysis → **Piecewise model**
V_1: a constant representing the **pre-challenge stage**.
V_2: the linear slope of the **response** during the 3-d **challenge**.
V_3 and V_4: the linear and quadratic components of the **recovery period** (post-challenge).
V_5: a constant representing the **stabilization period** (post-challenge).

Orthogonal contrasts → To test differences between pre-challenge (V_1) and stabilization (V_5) periods.

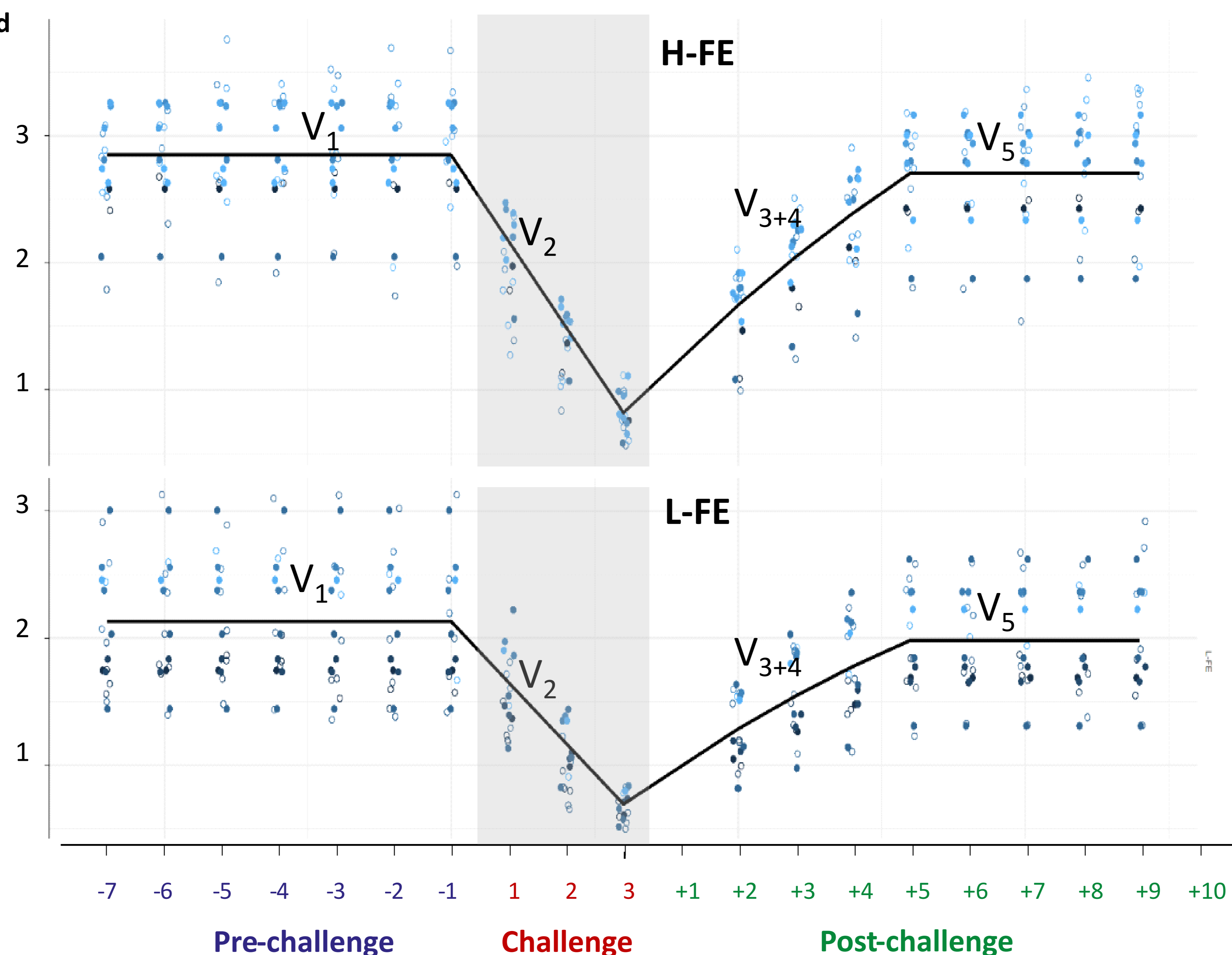## RESULTS AND DISCUSSION

1 V_1 was **greater** in **H-FE** (P<0.05), while the **DMI** was the **same in both groups** (P>0.10)

2 The **drop** (V_2) caused by the challenge was also significantly **stronger in H-FE** (P<0.05)

3 During the **recovery**: V_3 tended to be **lower** in **L-FE** (P=0.089) V_4 was **not different** between groups (P>0.10)

4 Stabilization period (V_5) was significantlly higher in **H-FE** (P<0.001)

5 Pre-challenge values (V_1) were **not fully recovered in either H-FE or L-FE** (0.05<P<0.10 for V_1 *vs.* V_5), which might be explained by a persistent **detrimental effect** of the **challenge**, at least in the short-term

Milk yield, kg/d

Pre-challenge | Challenge | Post-challenge

CONCLUSIONS

The **temporal pattern of variation in milk yield** seem to be **linked to the pre-challenge milk yield level** and **not to the FE**. In any case, results suggest that improving FE would not detrimentally affect resilience.