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Relationships between range use, performances and health and welfare related traits in four strains of organic broilers

Claire Bonnefous, Anne Collin, Laurence A. Guilloteau, K. Germain, Laure Ravon, Sandrine Mignon-Grasteau, Maxime Reverchon, Simona Mattioli, Cesare Castellini, Vanessa Guesdon, et al.

► To cite this version:

Claire Bonnefous, Anne Collin, Laurence A. Guilloteau, K. Germain, Laure Ravon, et al.. Relationships between range use, performances and health and welfare related traits in four strains of organic broilers. XVI. European Poultry Conference, WPSA, Jun 2024, Valencia (Espagne), Spain. hal-04669797

HAL Id: hal-04669797

<https://hal.inrae.fr/hal-04669797v1>

Submitted on 9 Aug 2024

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XVI European Poultry Conference
VALENCIA, SPAIN 24th-28th June 2024



Relationships between range use, performances and health and welfare related traits in four strains of organic broilers

Bonnefous Claire, Collin Anne, Guilloteau Laurence A., Germain Karine, Ravon Laure, Mignon-Grasteau Sandrine, Reverchon Maxime, Mattioli Simona, Castellini Cesare, Guesdon Vanessa, Calandreau Ludovic, Collet Julie, Berri Cécile,

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JUNIA Grande école d'ingénieurs

INRAE



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816172



Key request for European consumers - **Expression of natural behaviours** (walking/running, foraging, social interactions...) - **welfare**

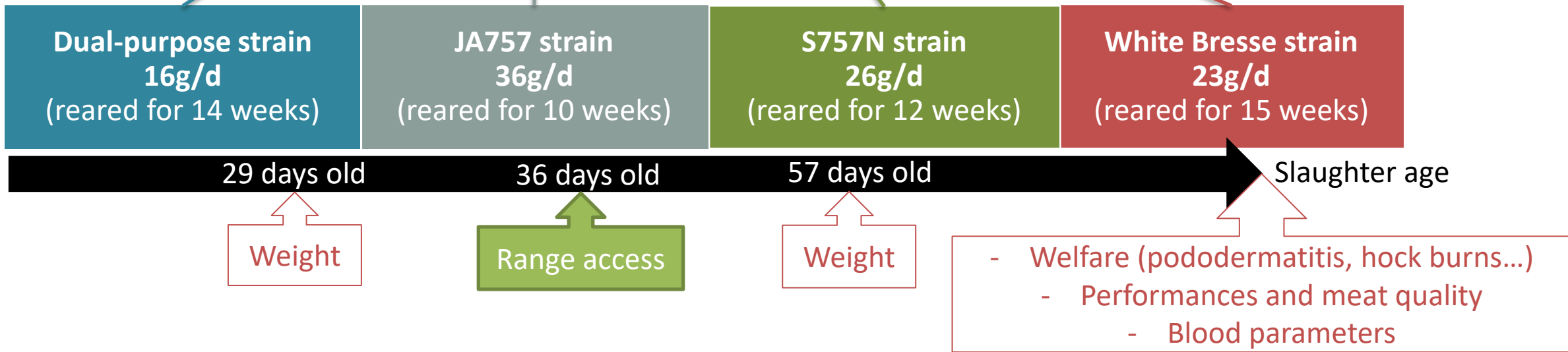
Interesting functions for the **agroecological transition** (nutrients inputs from plants and insects, closing nutrients cycles, biodiversity...)

Potential benefits are subject to the fact that **poultry use the outdoor space** and are able to maintain **good performances, health and welfare** when exposed to biotic or abiotic stress on the range

- **Variability of range use** between **individuals from different genetic lines** of broilers and **trade-offs between functions**

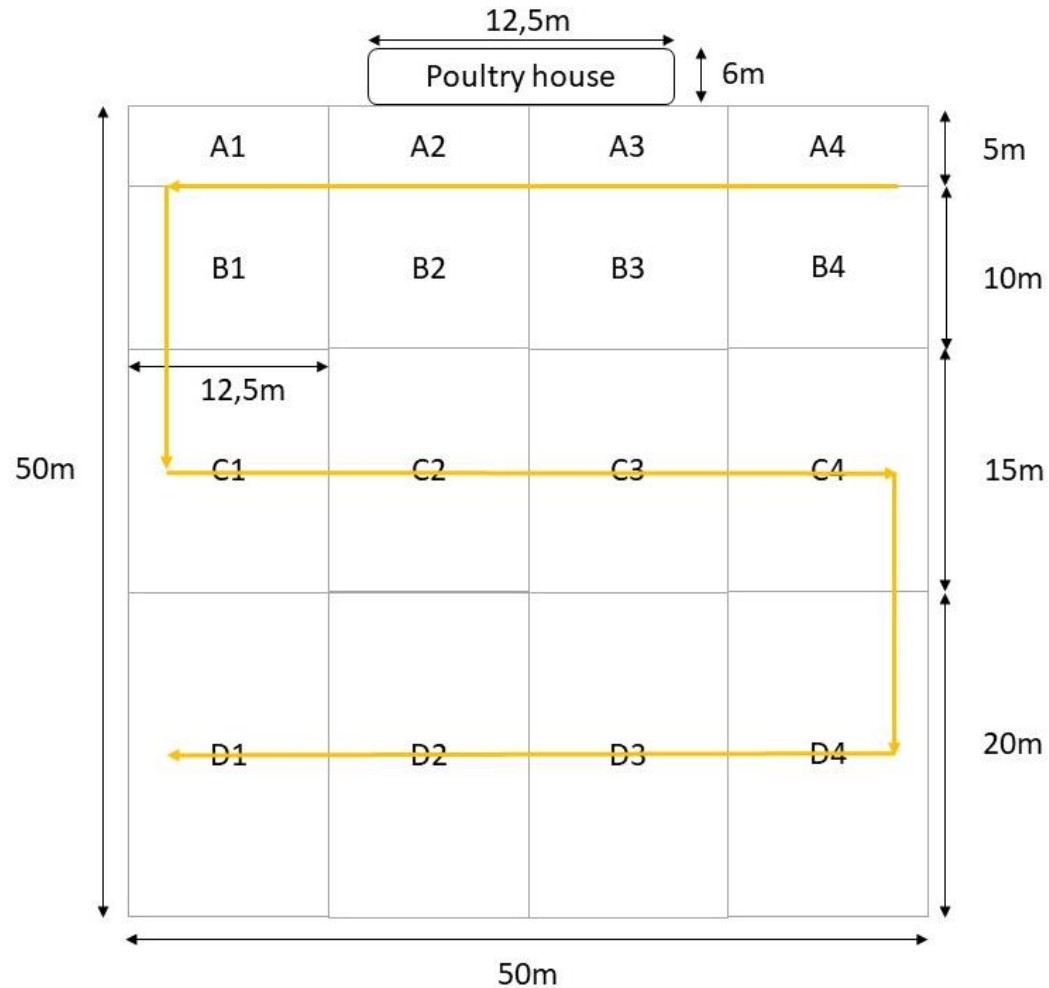
Method – Experimentation from February until June on outdoor range with trees

4 strains: 1 per range; 750 animals per strain ; 50% male, 50% female



Method – Evaluation of individual Range Use by the Distance Index (N=100 males per line)

FIGURE OF SCAN SAMPLING : ← Observer's path



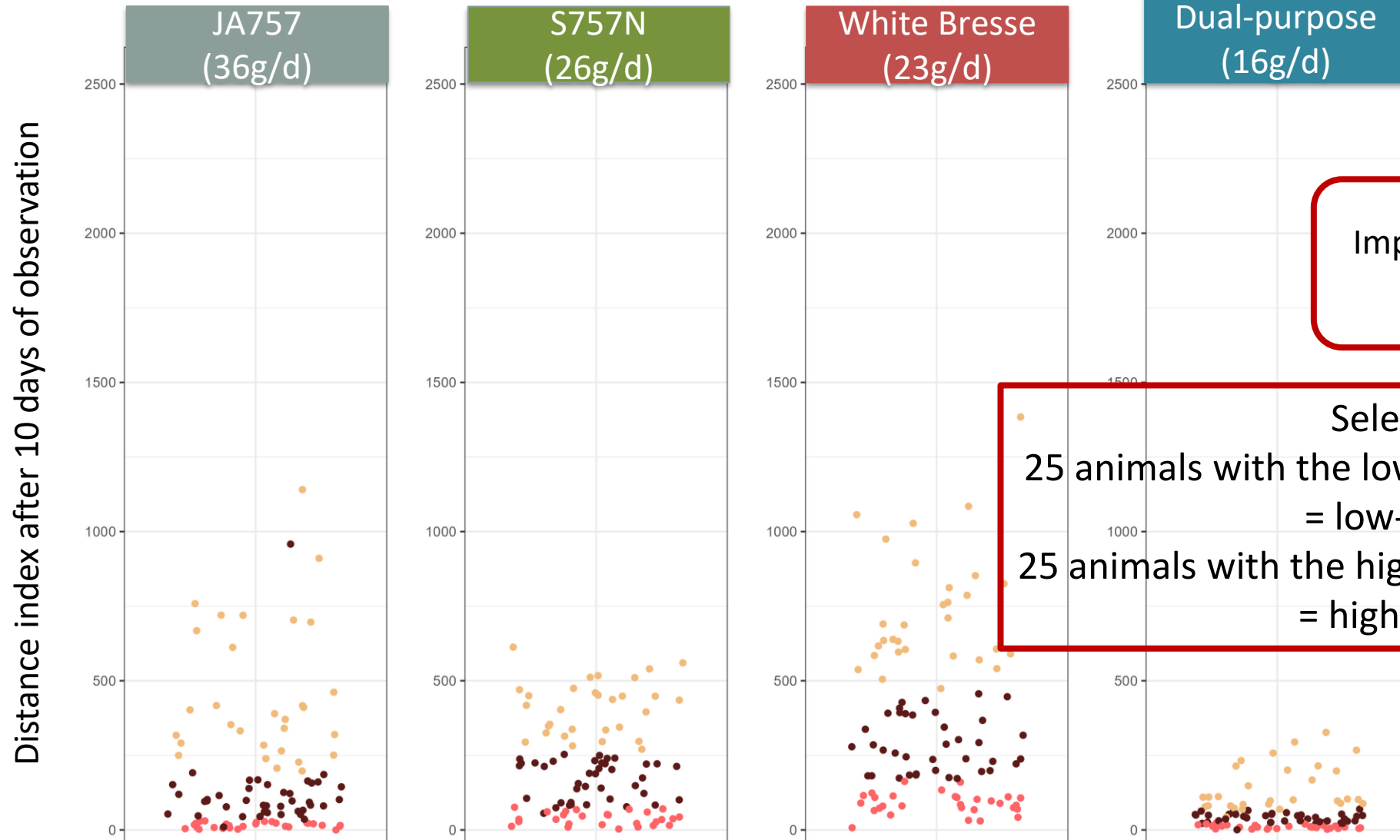
7 times per day of **Scan Sampling**
from sunrise to sundown

11 to 15 days of scan sampling
depending on the rearing length

Distance Index =

number of times recorded in zone A * 2.5 +
number of times recorded in zone B * 10 +
number of times recorded in zone C * 22.5 +
number of times recorded in zone D * 40

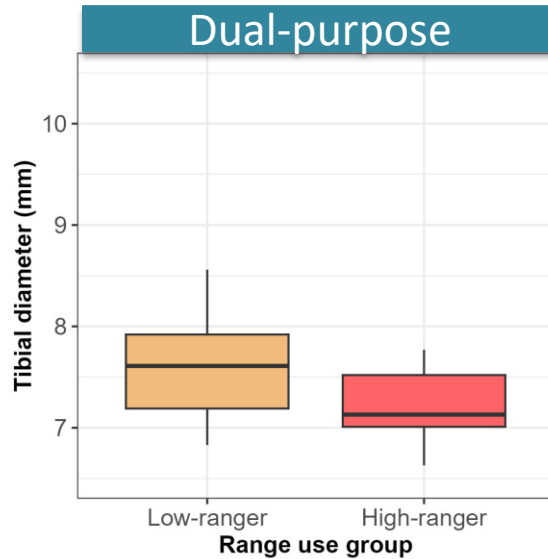
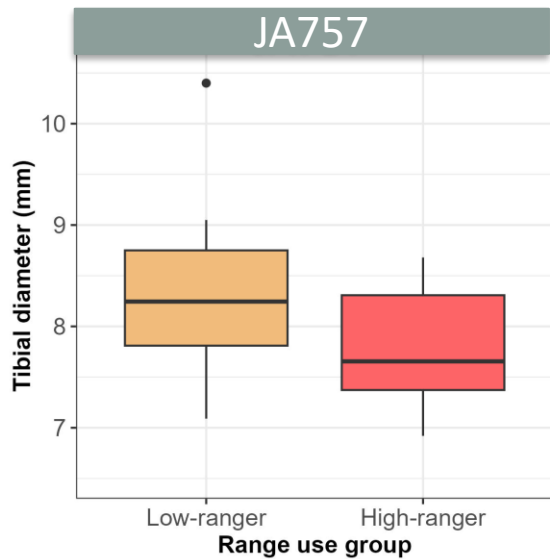
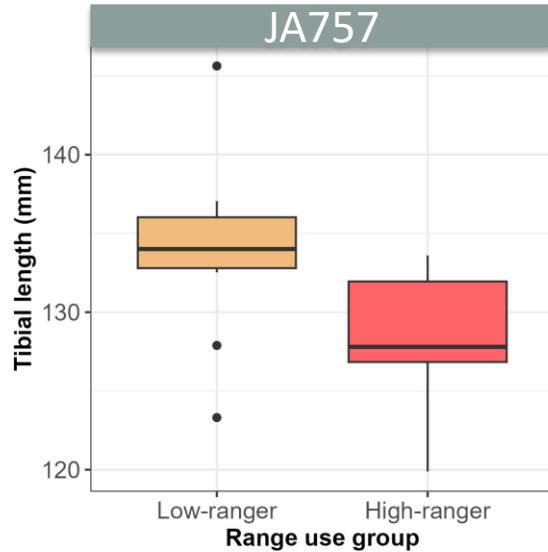
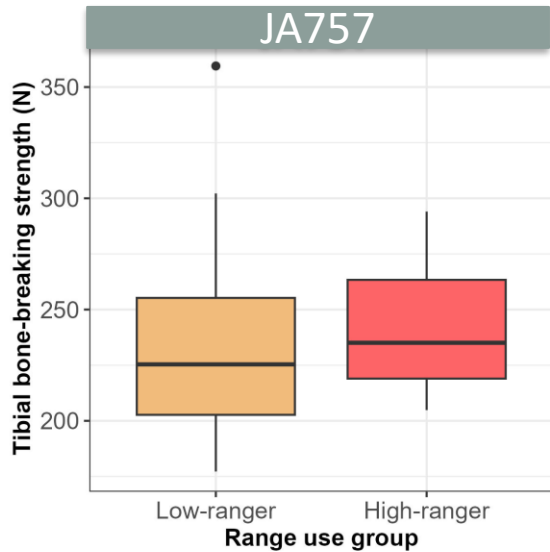
Results - Variability of individual range use



Impact of range use variation within strains?

Selection :
25 animals with the lowest Final Distance Index = low-rangers
25 animals with the highest Final Distance Index = high-rangers

Results - Relationship between range use and welfare indicators?



Range use

NO

Pododermatitis
Hock burns
Behaviour at slaughter

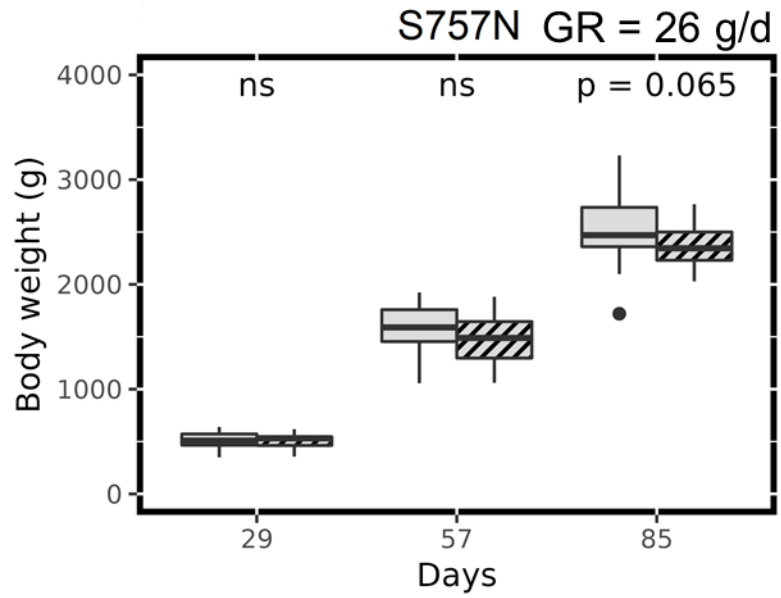
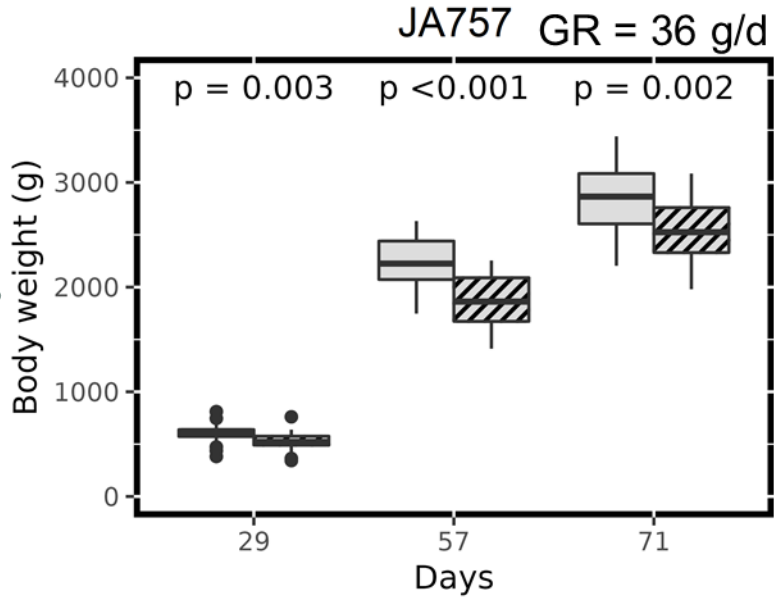
YES

Bone health
Increased bone strength +
decreased bone diameter and
length
Higher locomotor activity
of high-rangers

Results - Relationship between range use and **body weight**?

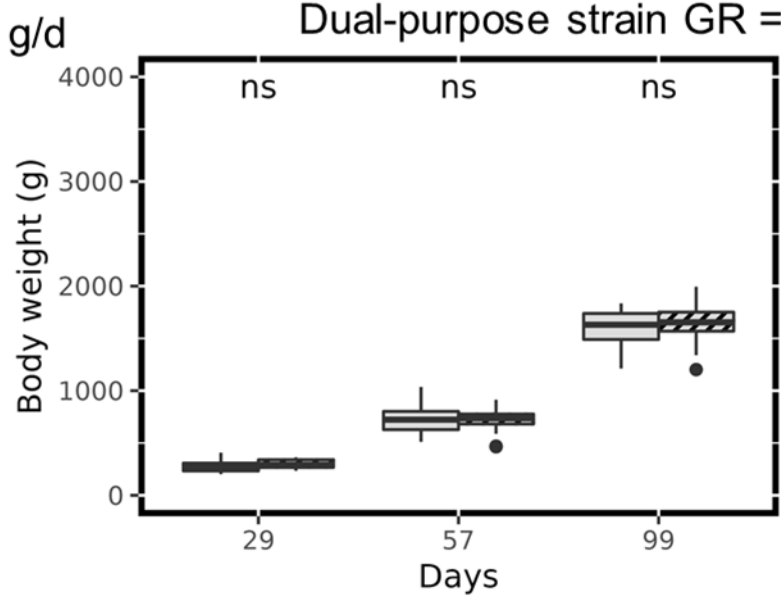
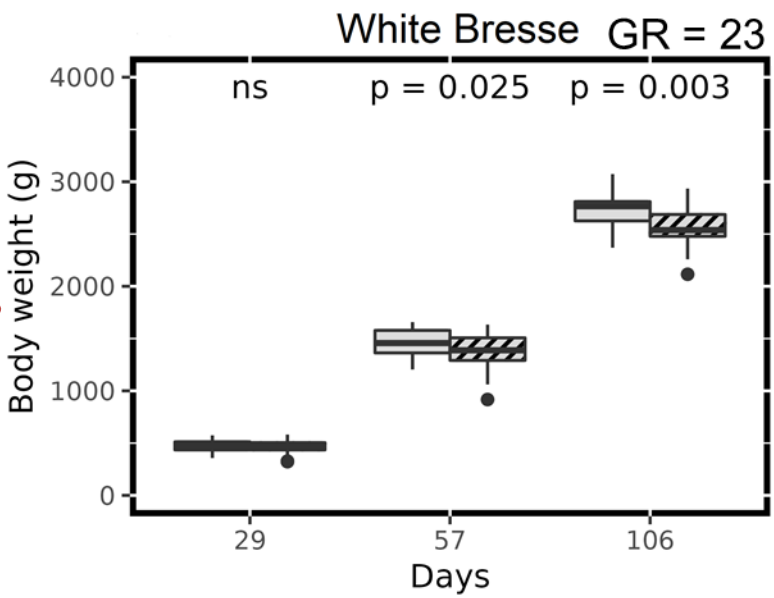
Low-rangers
High-rangers

Lower BW predispositional factor to higher range use?
HR birds already more active before range access?



Higher range use impairs final BW

Higher range use impairs final BW

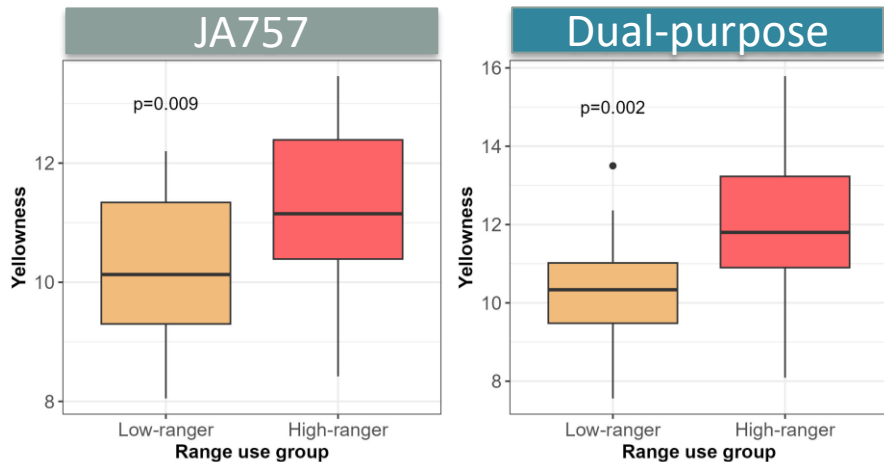


No relationship between range use and body weight

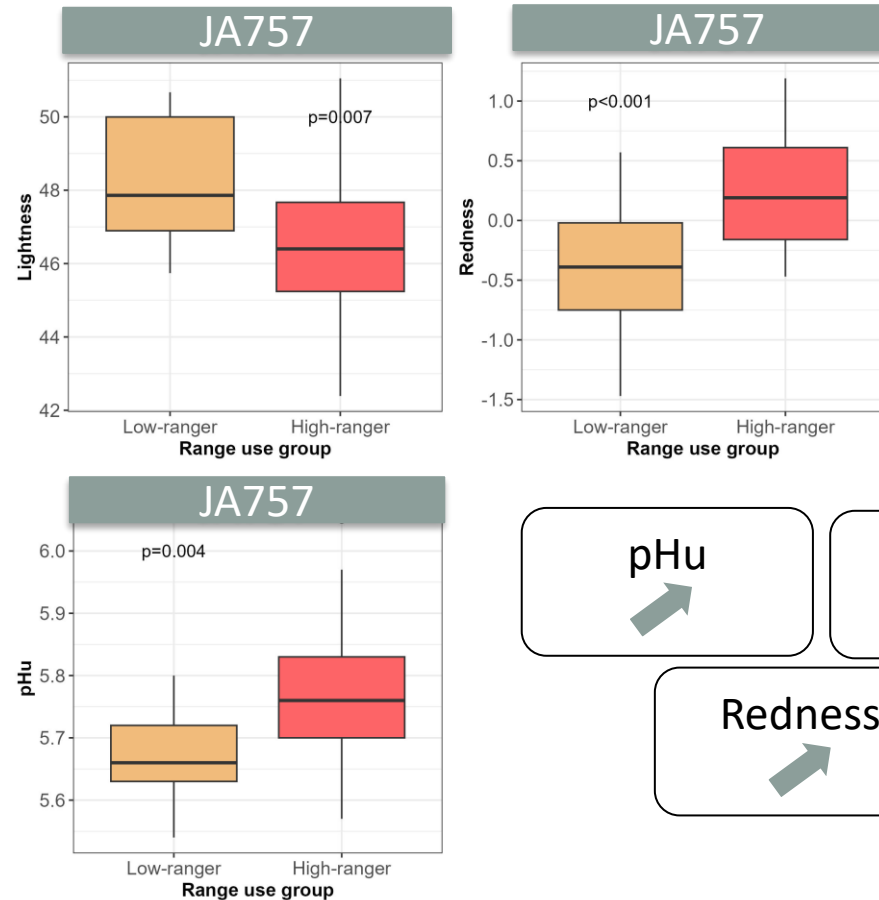
Results - Relationship between range use and meat production and quality?

In all strains but the dual-purpose, carcass/breast/thigh weights are higher in Low Rangers than in High Rangers

Yellowness



Foraging favors the intake of grasses that contain coloring carotenoids.



pHu



Lightness



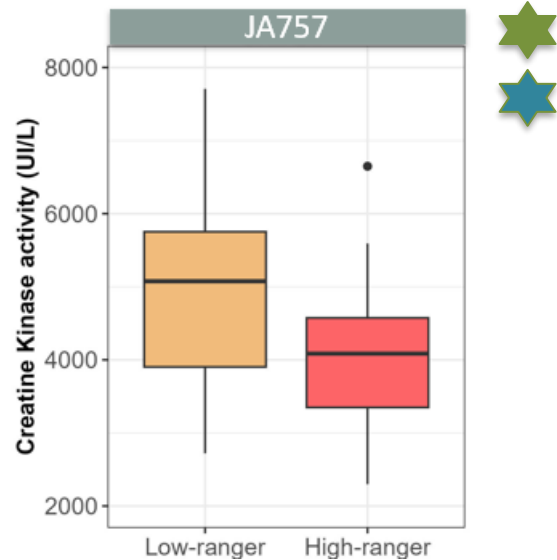
Redness



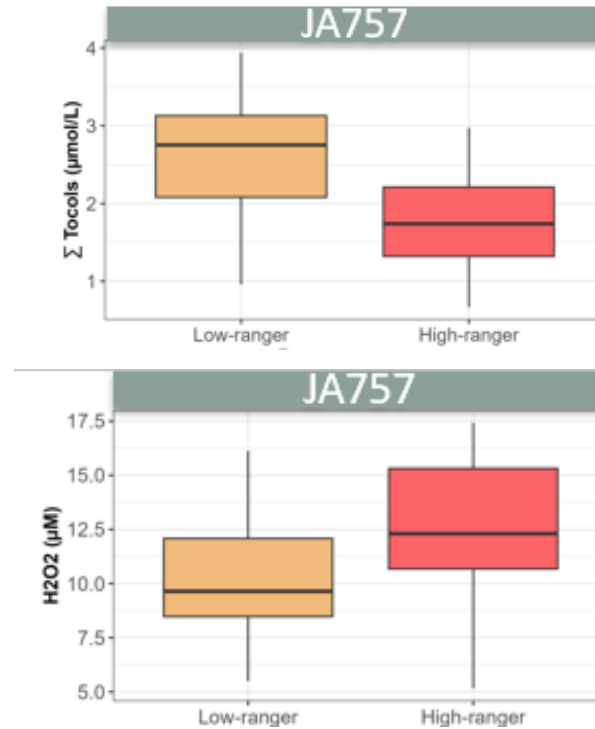
Physical exercise draws on muscle glycogen reserves and improves muscle vascularization?

Results - Relationship between range use and bird's physiology?

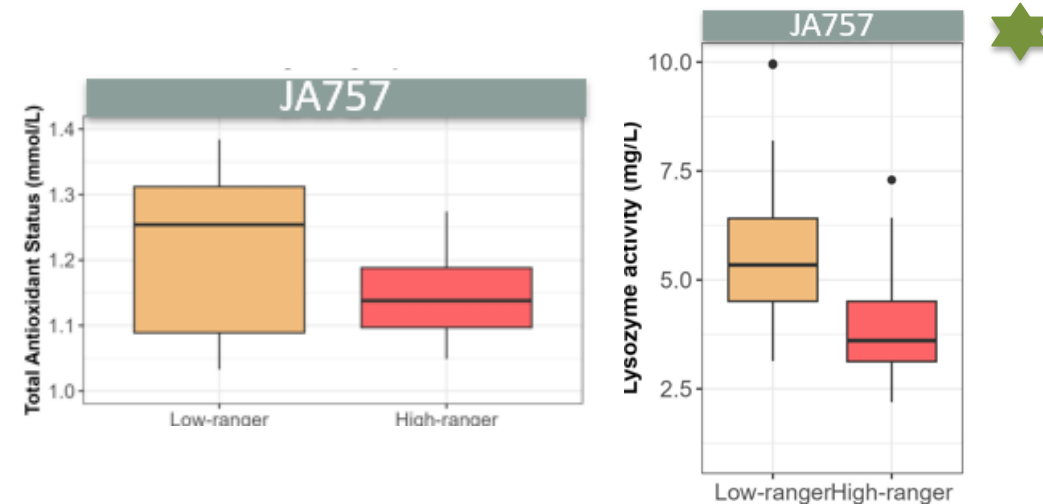
Muscle development



Redox status



Antimicrobial defense



- ★ JA757
- ★ S757N
- ★ White Bresse
- ★ Dual-purpose

In medium-growing birds, higher physical activity (in HR group) may limit muscle growth and antimicrobial potential and increase oxidative stress

Conclusions

- Range use is **highly variable** among breeds and individuals. More research is needed to decipher the role of **genetics and environment** on the expression of this personality trait.
- Interest of a **multi-trait approach** to evaluate the multiple consequences of range use and search for well adapted breeds or birds (*the most the range use is maybe not the best!*).
- Need for **tools to monitor range use** and **behaviours** of birds outside to develop studies at a larger scale (diversity of populations and conditions).



Thank you for your attention !



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