



**HAL**  
open science

## 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

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License



**XVI European Poultry Conference**

VALENCIA, SPAIN 24<sup>th</sup>-28<sup>th</sup> 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,**

**Le Bihan-Duval Elisabeth**



**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**

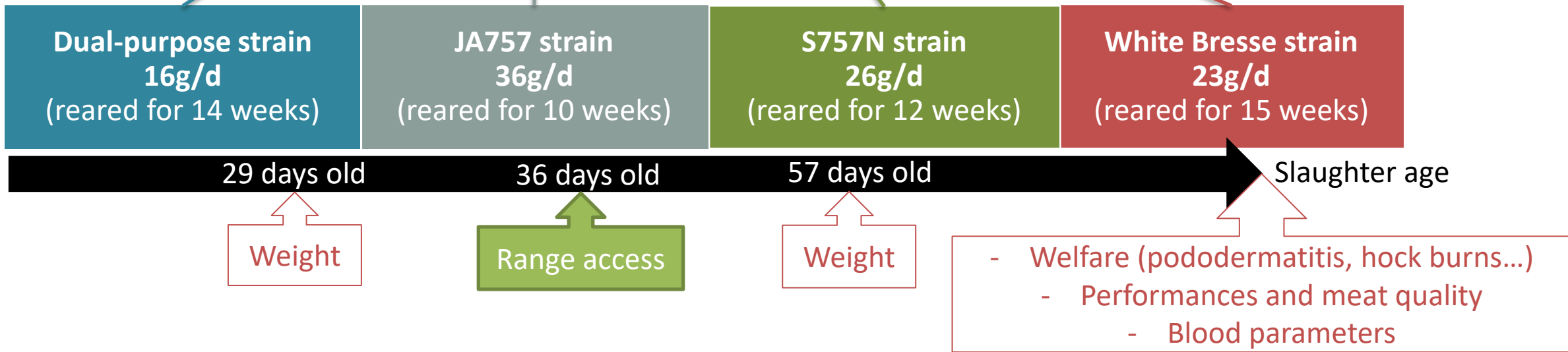
Interesting functions for the **agroecological transition** (nutrients inputs from plants and insects, closing nutrients cycles, biodiversity...)

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**

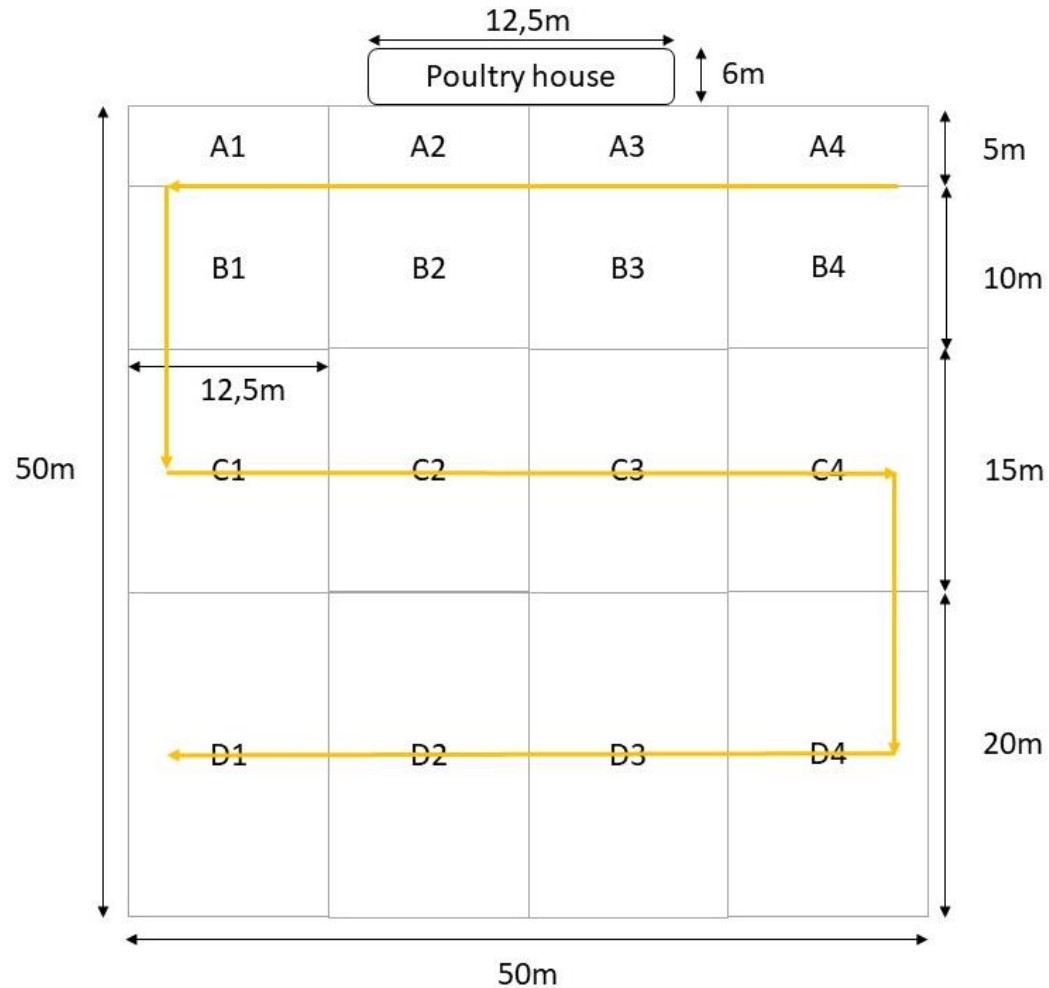
## Method – Experimentation from February until June on outdoor range with trees

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

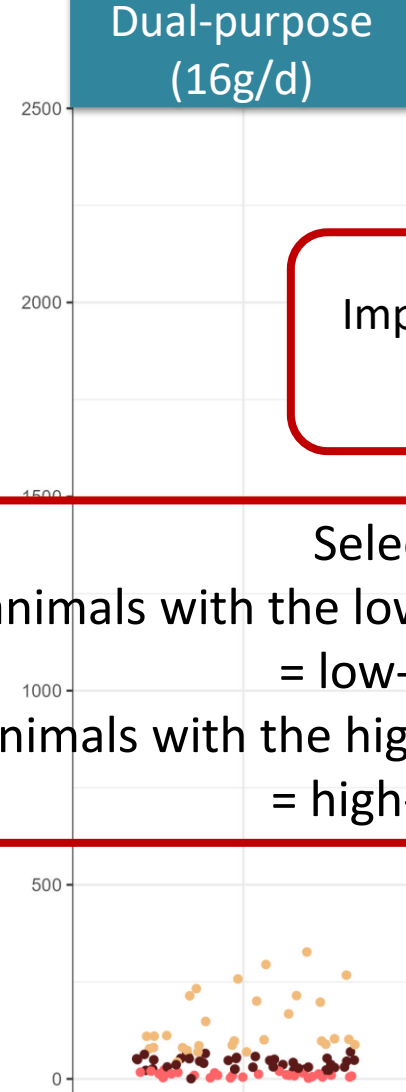
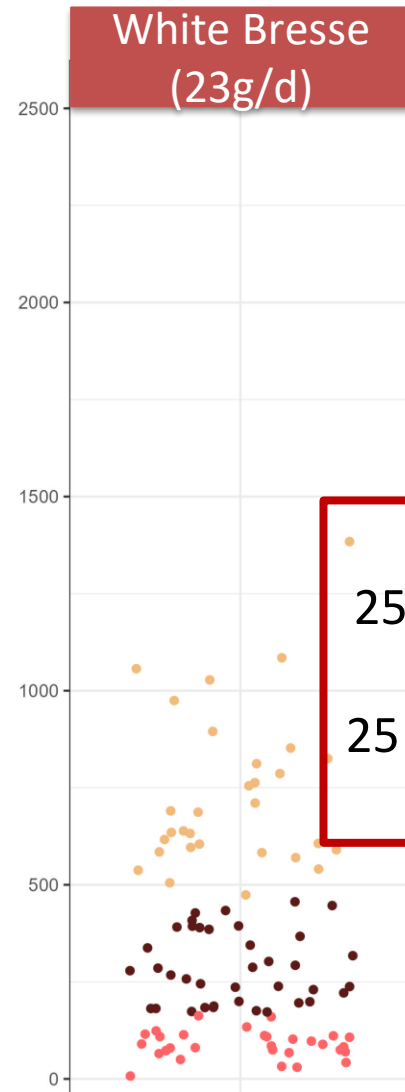
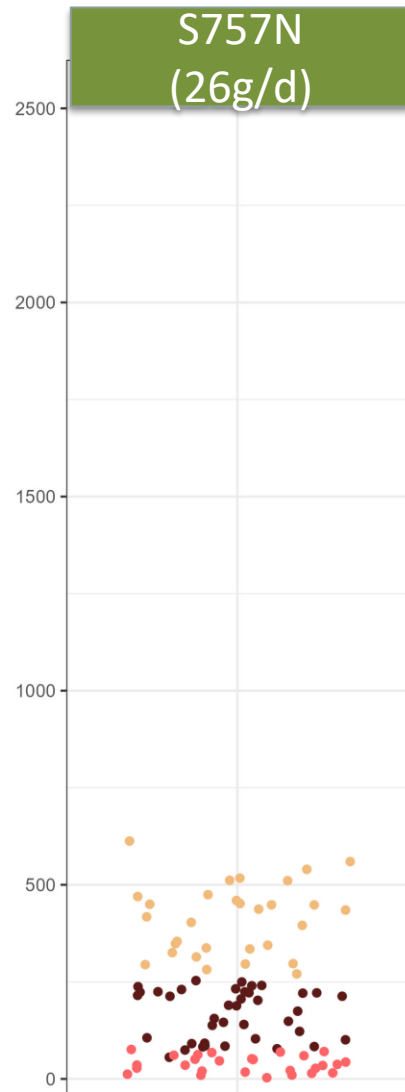
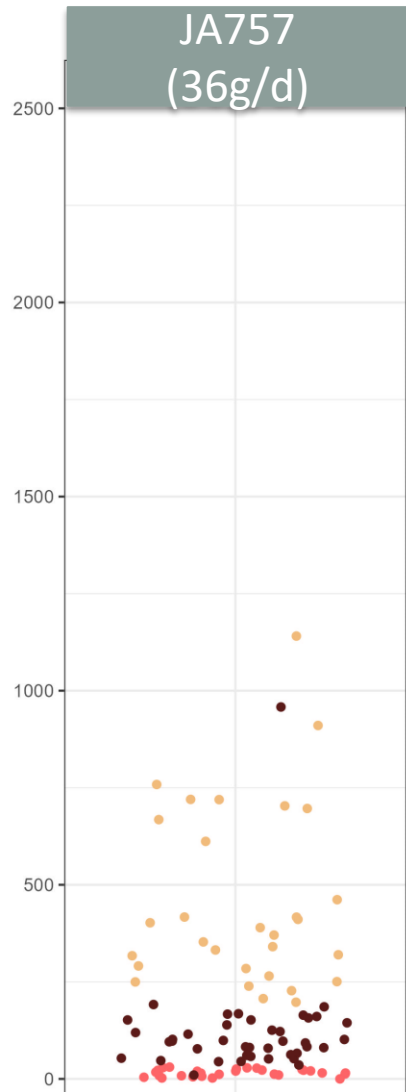
11 to 15 days of scan sampling  
depending on the rearing length

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

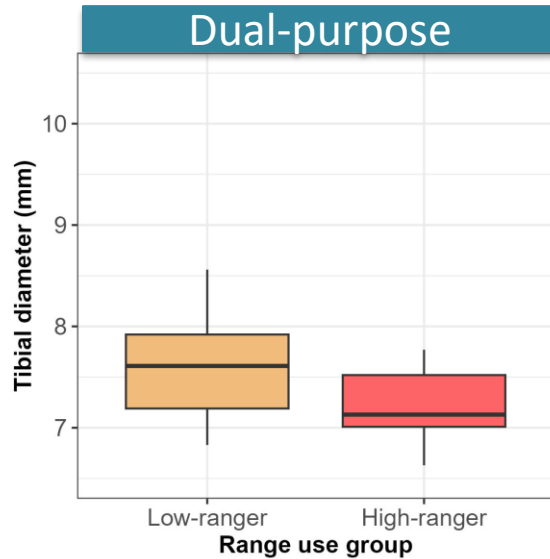
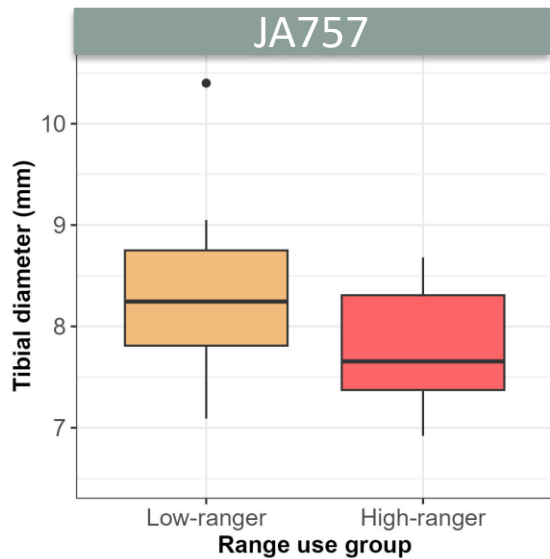
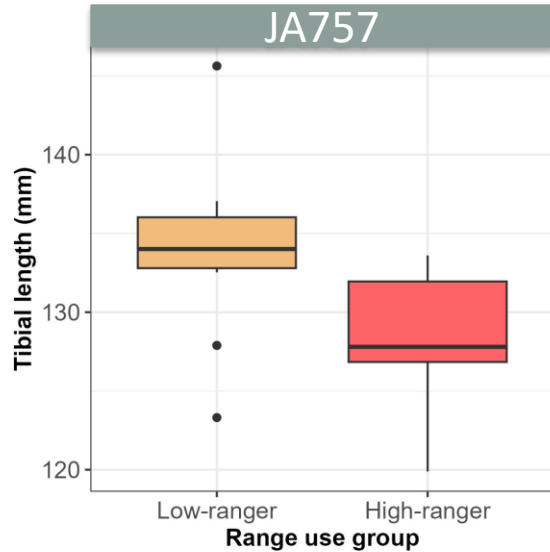
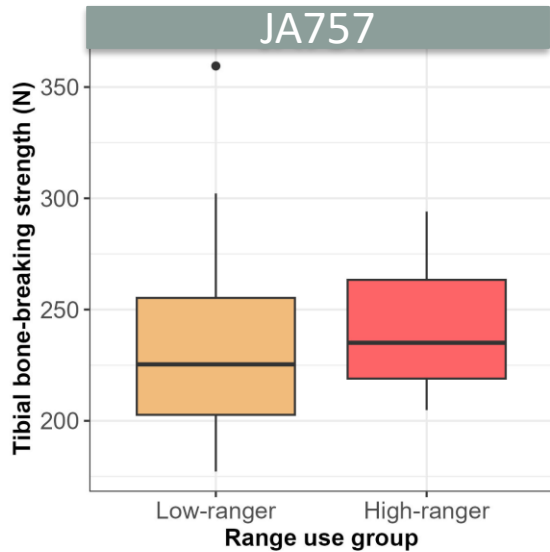
Distance index after 10 days of observation



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

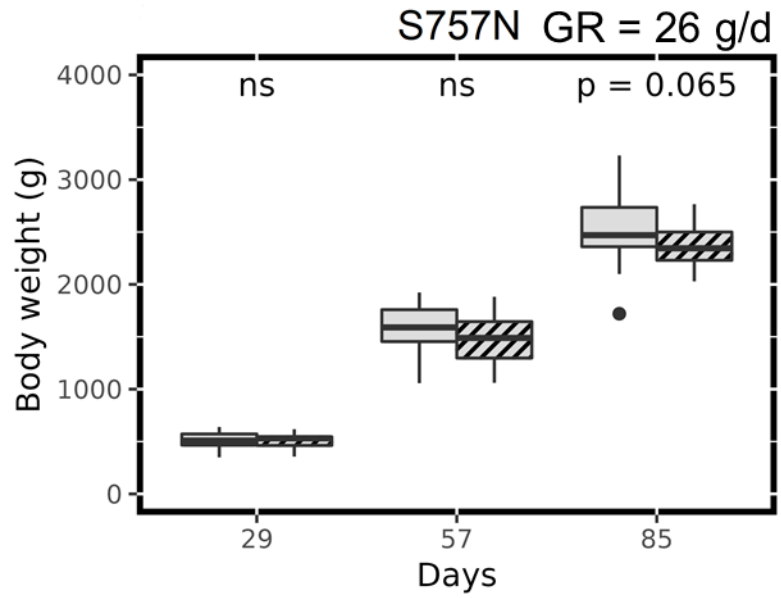
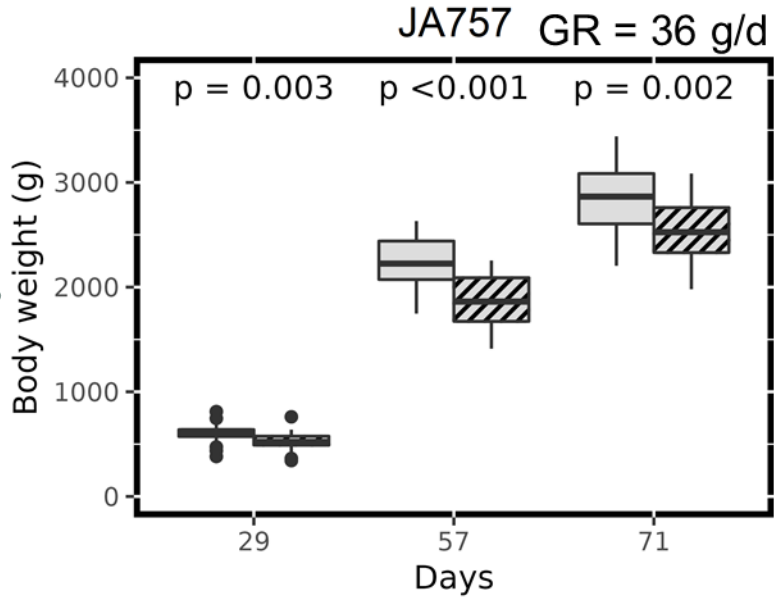
YES

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

# Results - Relationship between range use and body weight?

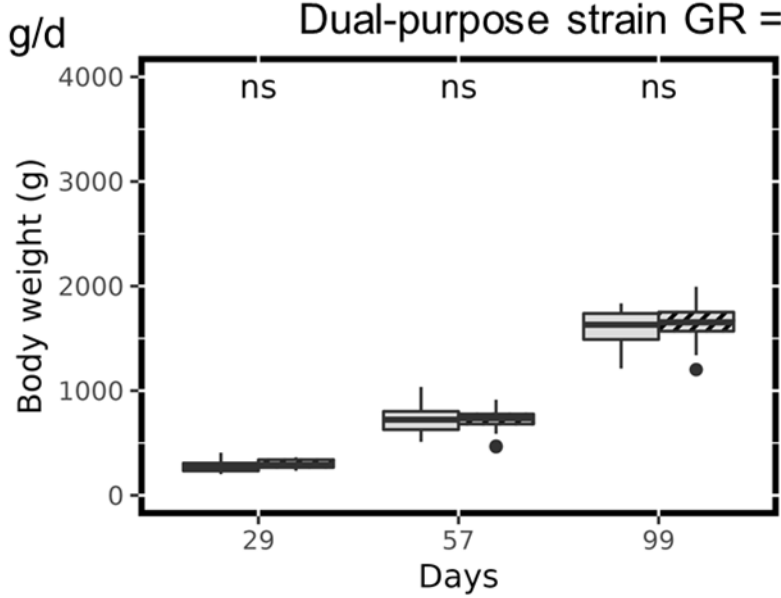
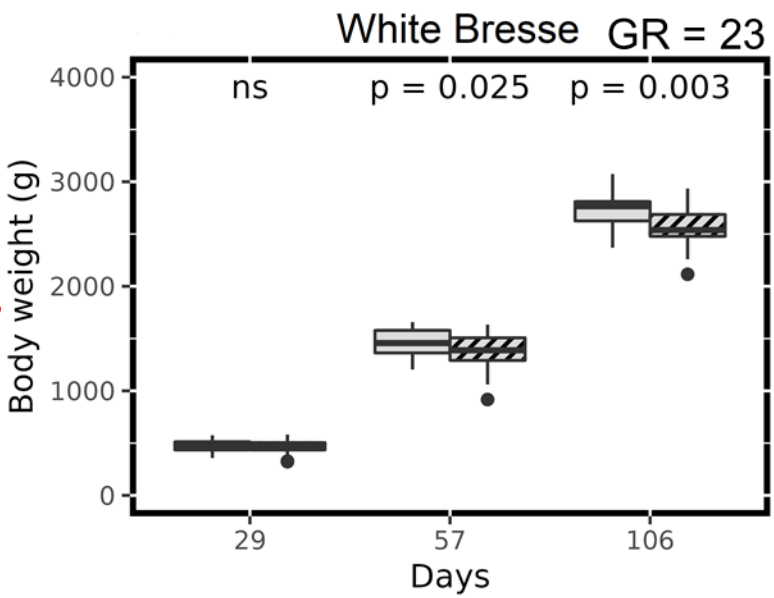
Low-rangers  
High-rangers

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



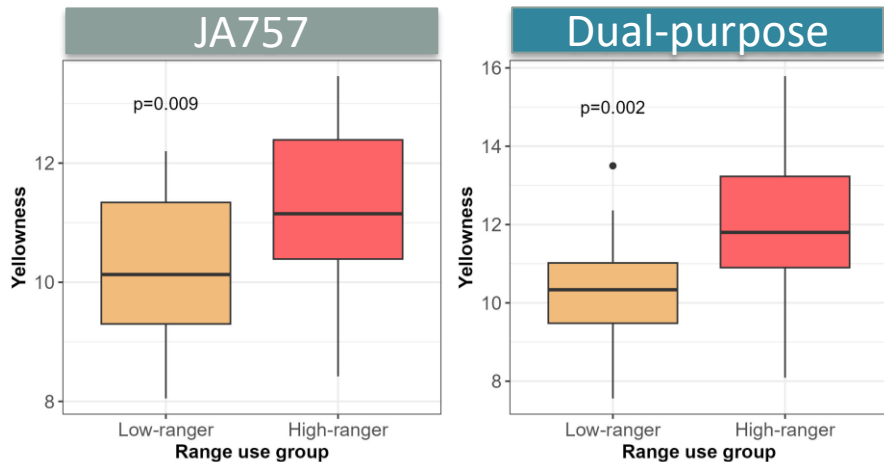
No relationship between range use and body weight



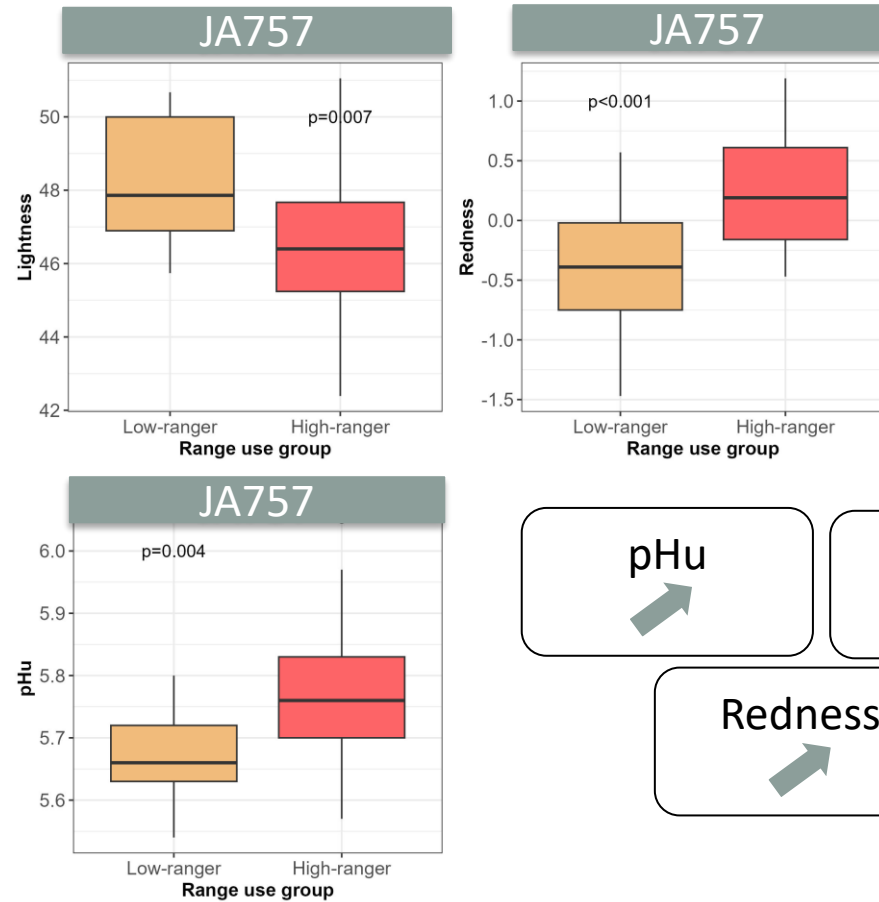
# Results - Relationship between range use and meat production and quality?

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



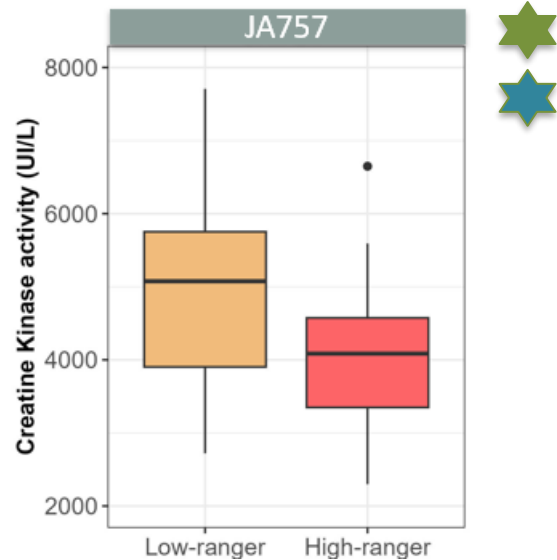
Redness



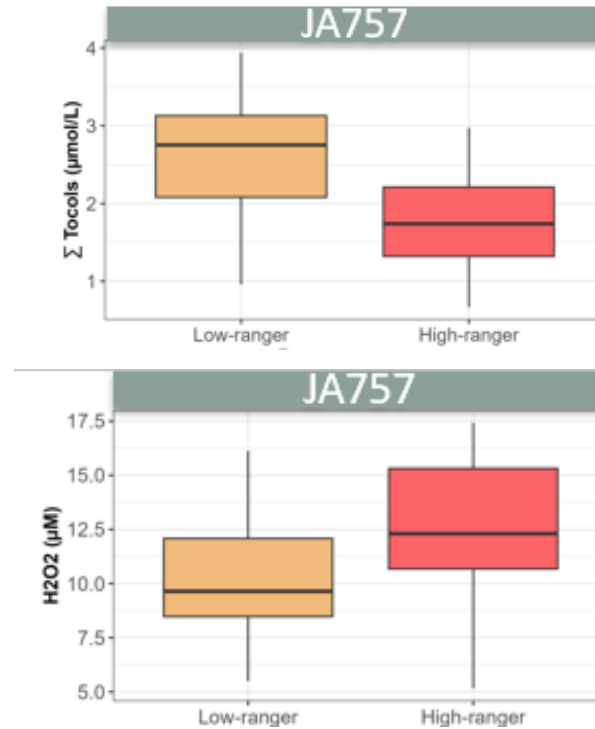
Physical exercise draws on muscle glycogen reserves and improves muscle vascularization?

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

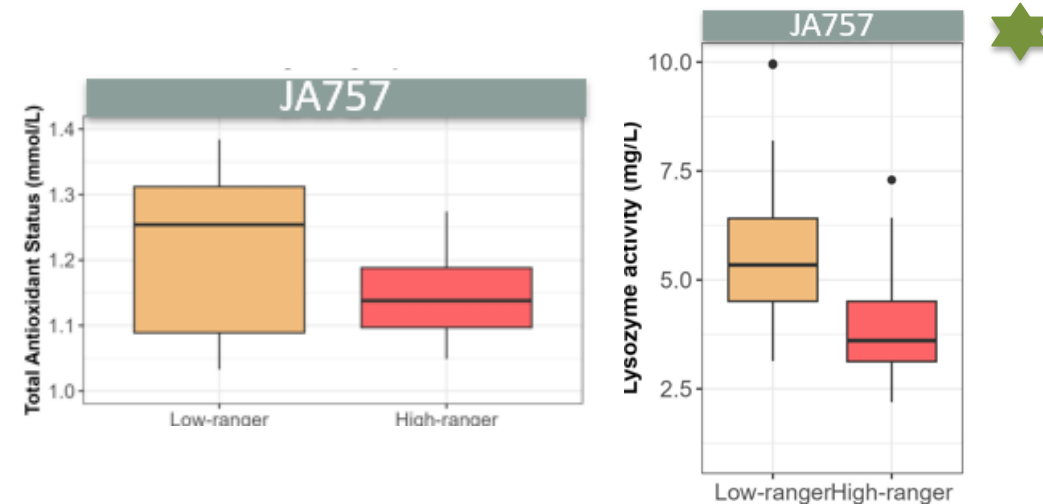
## Muscle development



## 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 !



Fondazione Slow Food  
per la Biodiversità  
ONLUS



Harper Adams  
University



INSTITUUT VOOR LANDBOUW-  
EN VISSERIJONDERZOEK



Utrecht University



[www.ppilow.eu](http://www.ppilow.eu)