# Genetic parameters for lifetime locomotor activity in group-housed broilers recorded using a RFID-system

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## Locomotor activity

Individual activity levels informative

Health e.g. illness (Gregory, 1998)

Welfare e.g. leg weakness (Van Hertem et al., 2018)

Production e.g. body weight (Reiter & Bessei, 2001)



# Measure activity

#### Radio frequency identification (RFID) tracking



#### To estimate **genetic parameters** for individual locomotor **activity** collected throughout the life of **group-housed** broilers

#### Using RFID tracking

Daily activity (average distance moved/hour for a specific day)

Repeated measurement model – effect of age







- 30 antennas in a grid underneath floor One sample per second Antennas Ε 1.80
- RFID tag in leg band: 15 x 3.7 mm, < 1 gram</p>









387 purebred male broilers with pedigree



Pen with ~80 broilers - 5 rounds of data





#### Models



#### Fixed effects:

- Round
- Day
- Round\*Day



### Results: Average daily activity



## **Results:** Genetic parameters



# Current & Future research



#### **Keypoint detection**

#### 8 keypoints



Limited further training



4.0 px test error (1,280 x 720 px)

#### Doornweerd et al. (2021)



- Individually tagged  $\mathcal{J}$ , same cross
- D14 (n=109), D21 (n=108), D33 (n=87)
- Body weight



#### Pose features ~ gait







Sharper hock joint angle -2.2° \* [95% CI: -4.3 - -0.1°]

Good: 152.9° Suboptimal: 150.7°



Smaller hock-feet dist. ratio -0.03 \* [95% CI: -0.06 - -0.01]

> Good: 0.87 Suboptimal: 0.84

Lower steps -4.5% \*\* [95% CI: -7.2 - -1.7%]

Good: 37.7% Suboptimal: 33.2%

# Phenotype poultry with computer vision







Phenotype





#### Doornweerd et al., 2021, 2023a, 2023b

# In summary

- Daily activity is heritable
- Heritability changes over time
- Future:
  - Relation with other traits
  - Computer vision
  - Locomotion







