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Genetic relationship between ascites and body weight at different ages in broilers

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Background and Aim

- Ascites is caused by an imbalance between oxygen requirement and cardiovascular ability to supply oxygen.
- Fast growing chickens require more oxygen and are, therefore, expected to be more susceptible to ascites.

Aim of study

- Estimate genetic parameters for the ascites-indicator trait, heart ratio, and for body weight measured at three different ages.

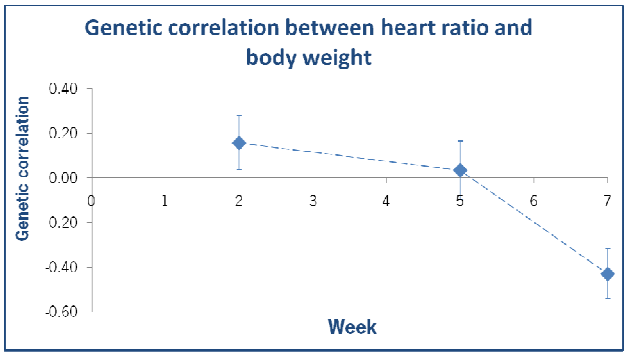
Conclusion

- Broilers with a high genetic potential for early growth are slightly more susceptible to ascites:
  - $r_A = 0.16$
- At later ages, broilers with high genetic ability for ascites have lower body weights:
  - Genetic correlation between heart ratio and body weight is affected by the incidence of ascites.
- The presence of ascites influences the genetic correlation between heart ratio and body weight.

Results

Traits	h^2 (1)	m^2 (2)
BW2	0.33	0.06
BW5	0.22	0.05
BW7	0.18	0.04
RATIO	0.35	0.02

1) heritability: SE between 0.04 and 0.05;
2) maternal environmental effect: SE 0.01.



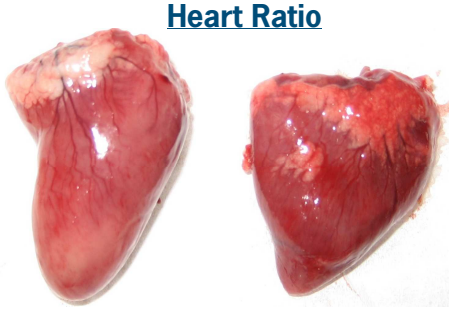
Materials and Methods

- Experimental population: 7,900 broilers
- Ascites inducing conditions: Cold temperature and high CO_2
- Phenotypes:
  - Heart ratio
  - Body weight at 2, 5 and 7 weeks
- Model:

$$y = \mu + sex + batch*stable + age + animal + dam + e$$

$$animal \sim N(0, A\sigma_a^2) \quad dam \sim N(0, I\sigma_d^2) \quad e \sim N(0, I\sigma_e^2)$$

Heart Ratio



RATIO = right ventricular weight divided by total ventricular weight.
Normal heart (left) and ascitic heart (right) from 24 days old broiler.

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Supported by Research and Technology Centre, Hendrix Genetics, Boxmeer, The Netherlands and by STW, The Netherlands

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