

CONTEXT - With the diversification of feedstuffs used in poultry diets, the relative importance of digestive efficiency (DE) in feed efficiency is becoming more important. Technologies as near infrared spectroscopy facilitated the measure of DE on a large number of animals, but sample preparation is still time consuming and the total collection of feces is ethically questionable as animals have to be reared in cage. As serum color has previously been found to differ between two lines of chickens selected for high (D+) or low (D-) digestive efficiency, we tested whether this criterion could be used as a biomarker of DE for selection.

MATERIALS AND METHODS

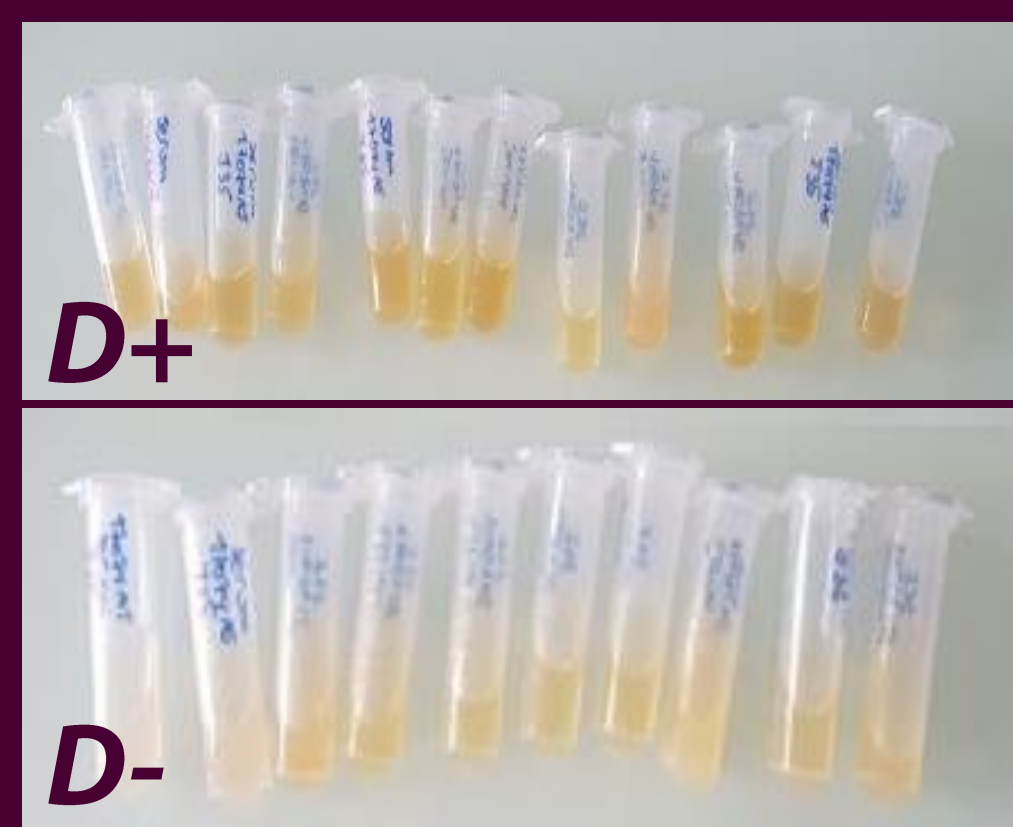
Animals:

- 417 male and female chickens from D+/D- lines selected for divergent digestive efficiency at 3 weeks.
- High-fiber content diet including 51% wheat and 5% rye.



Measure of:

- Digestive efficiency between 21 and 24 d (AMEn) obtained by NIRS
- Body weight (BW) at 24 d
- Feed intake (FI) between 21 and 24 d
- Serum color (SC) at 24 d obtained by spectrophotocolorimetry for wavelengths every 2 nm between 300 and 572 nm.



Genetic parameters estimates

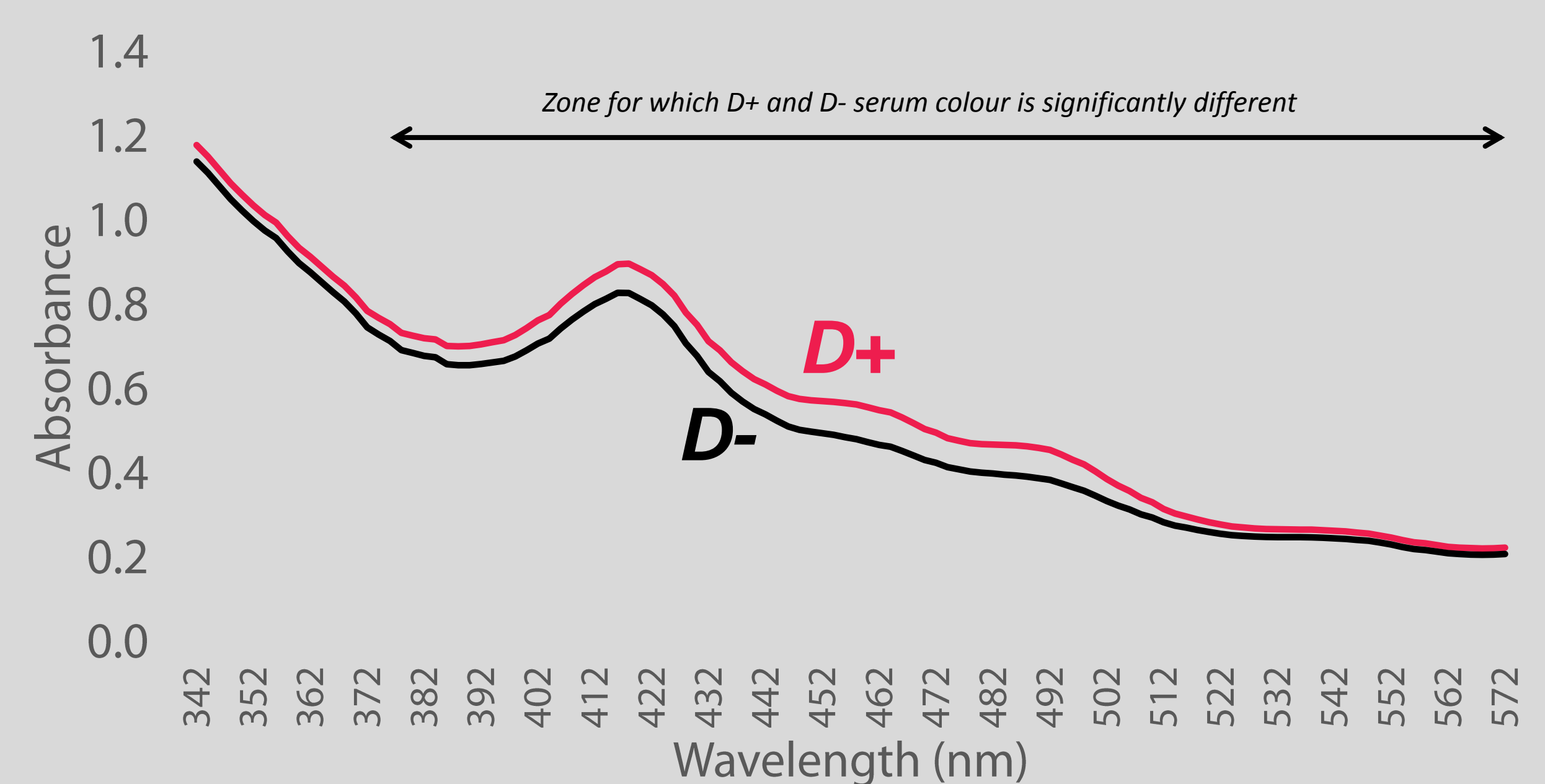
- Animal model with fixed effects of hatch, pen, sex and plate (for SC only)
- VCE 6.0 software
- Comparison of expected response to selection of AMEn following indirect selection on BW, FI or SC or following direct selection of AMEn

CONCLUSION AND PERSPECTIVES – In our conditions, serum colour at 492 nm is a biomarker that can be used for indirect selection of digestive efficiency. Further experiments are now undergoing to confirm the relationship between digestive efficiency and serum colour in other genotypes and other diets.

RESULTS

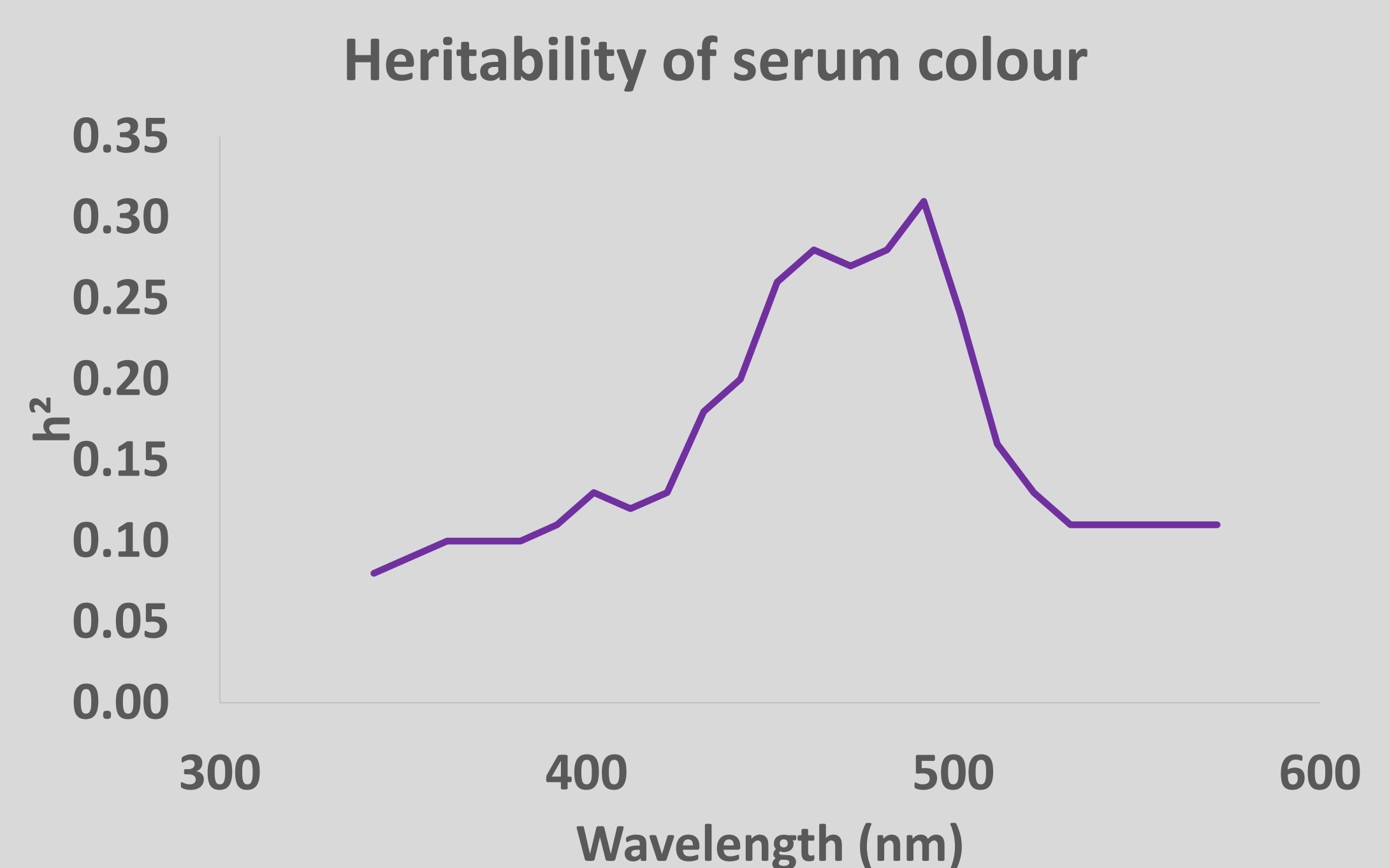
SC difference between D+ and D- birds:

Serum color was significantly yellower in D+ than in D- birds from 376 to 572 nm, the most significant differences were observed at 490-492 nm.



Genetic parameters:

Heritability of serum color is significant between 462 and 502 nm, with a maximum value of 0.31 ± 0.09 at 492 nm.



Response to selection:

Taking into account genetic correlations between DE and SC, BW or FI, SC at 492 nm would be the most efficient indirect criterion of selection, with an expected response to selection equal to 78% of the expected response to direct selection. For the same intensity of selection.