

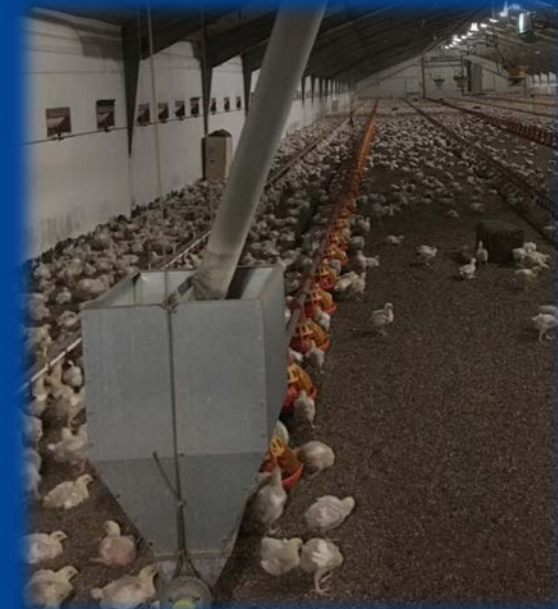
The importance of **early incubation temperature** for embryonic development, post-hatch growth and ability to walk in **chicks** – a new research collaboration between the industry, SEGES and Aarhus University

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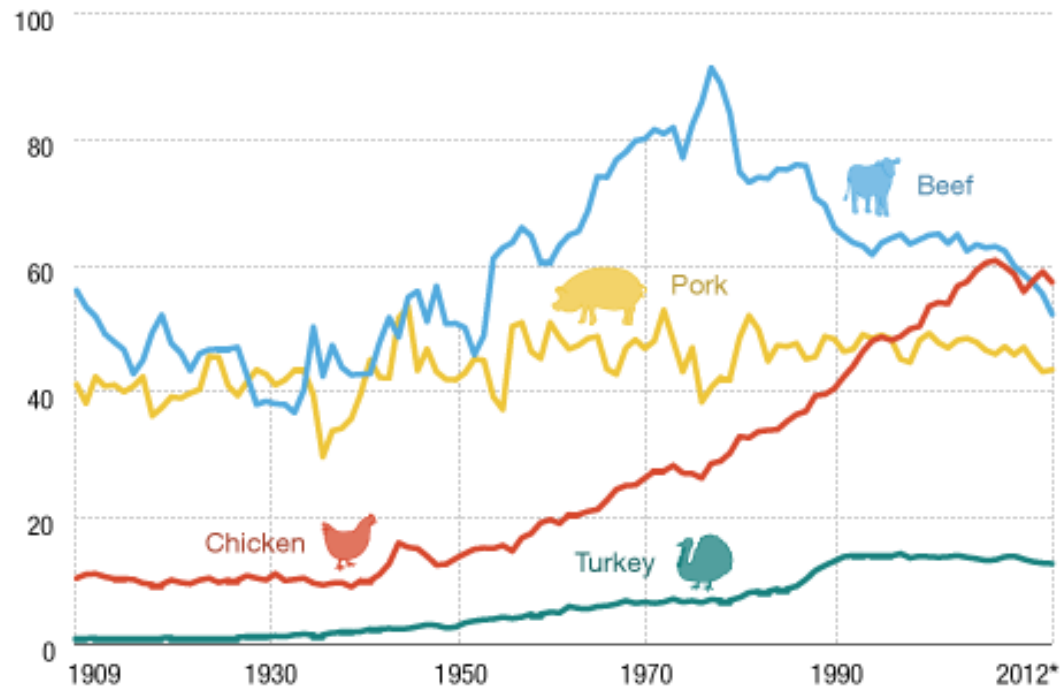
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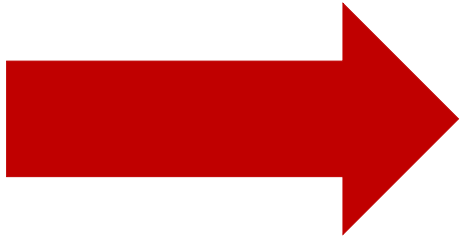


Demand met by genetic selection

US meat consumption per person in pounds (Earth policy Institute, Angela Wong)

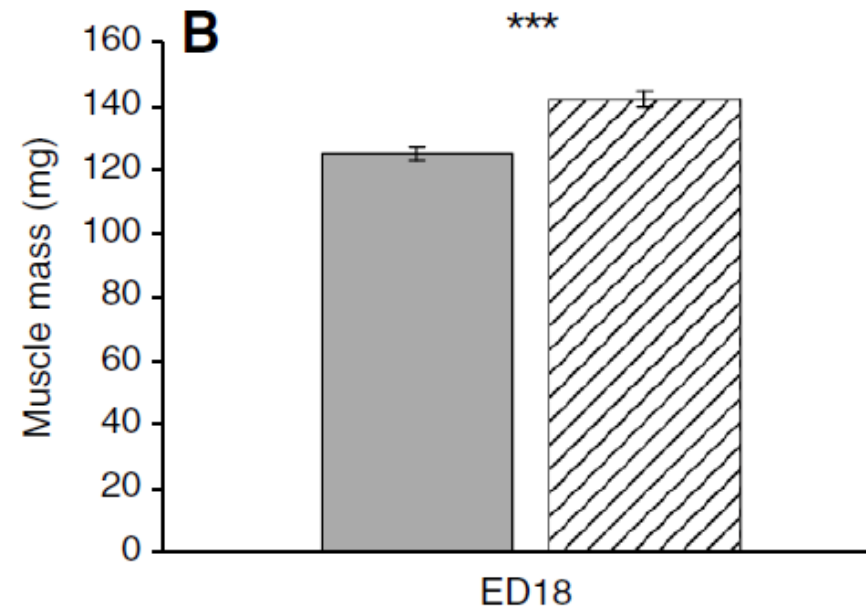
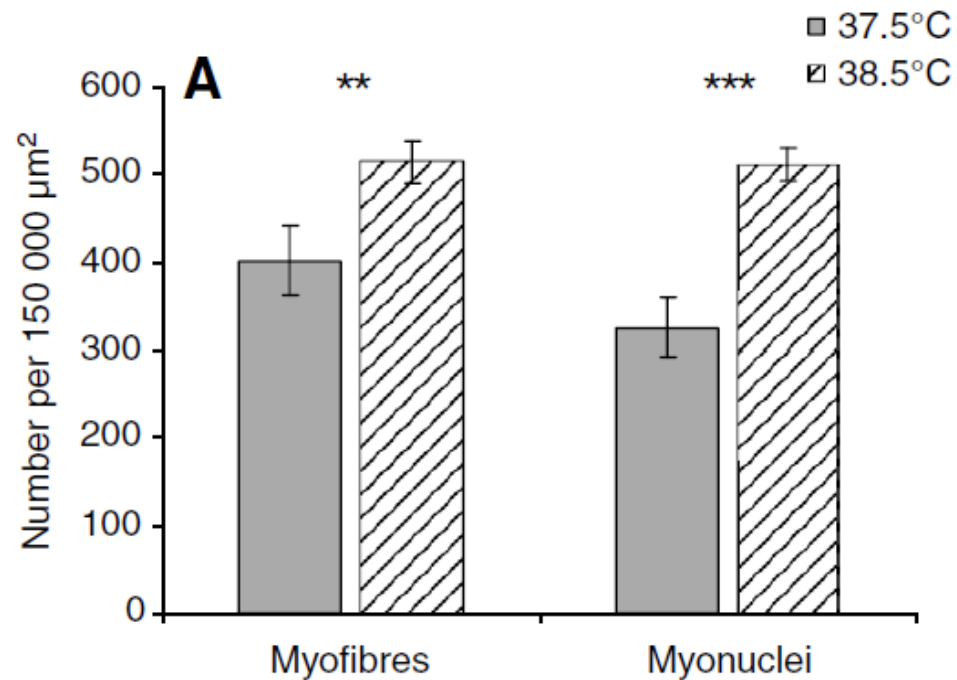


Selection specifically for greater yield of breast, but not leg meat



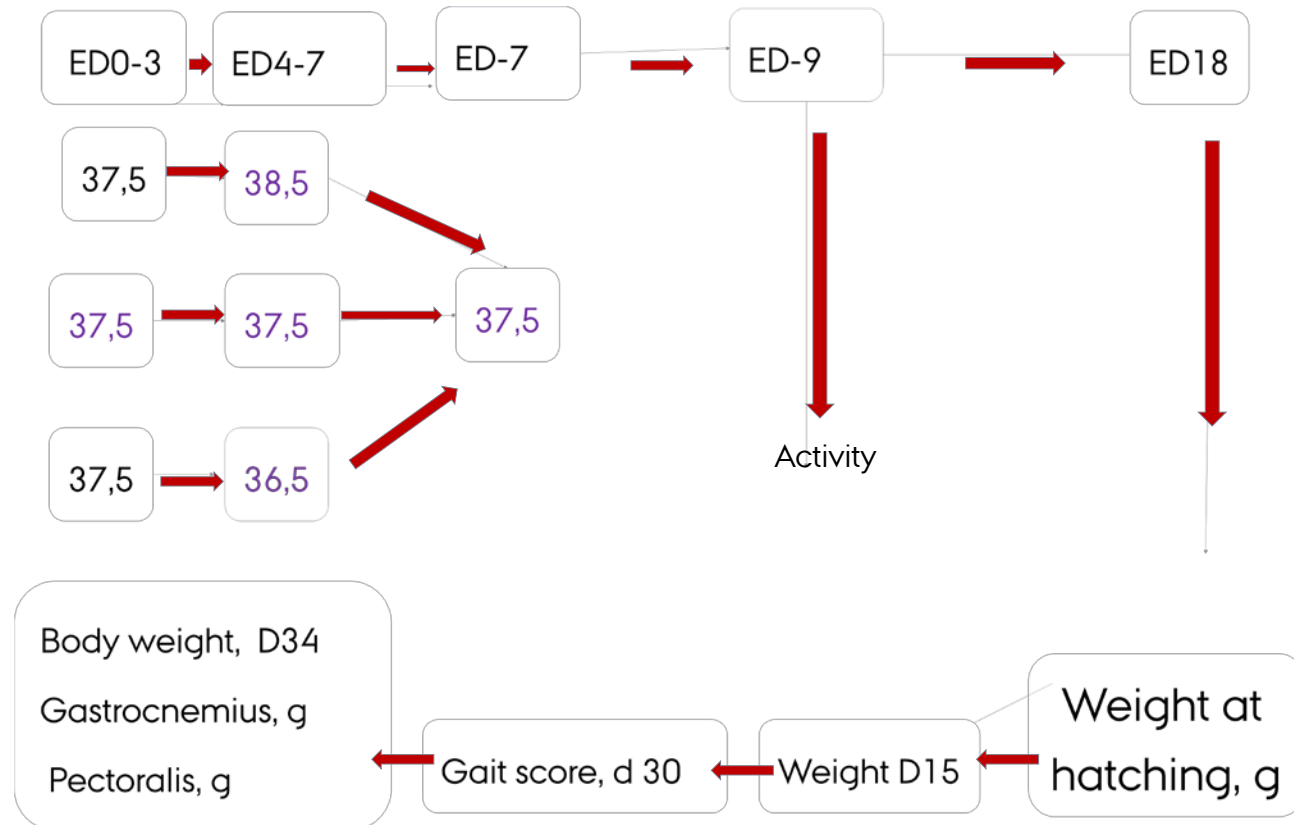
- Imbalance in body conformation – increased weight of *M. pectoralis* but not the supporting muscles in leg
- Leg disorders
- Impaired ability to walk
- Major welfare issues

C. Hammond, B.H. Simby and N. C. Stickland (2007) provided results that might suggest a solution to this development by use of **fetal programming**



Design – Incubation temperature

3 x 72 fertilized eggs (Ross 308)

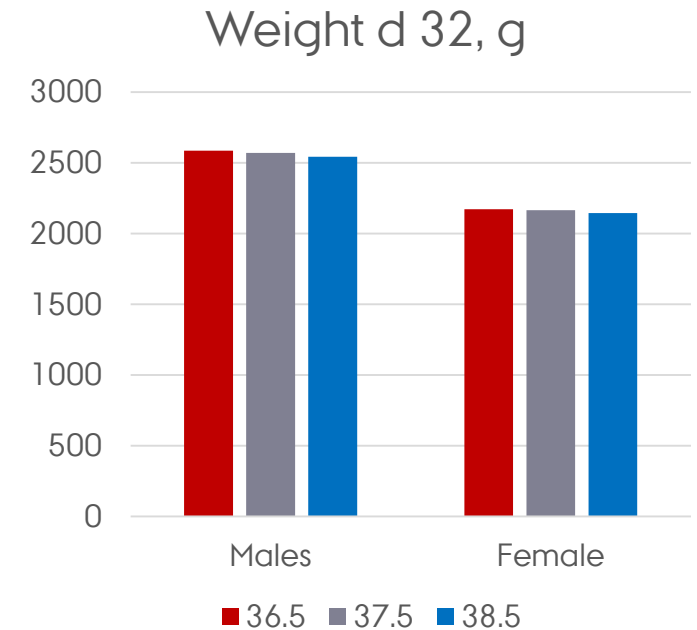
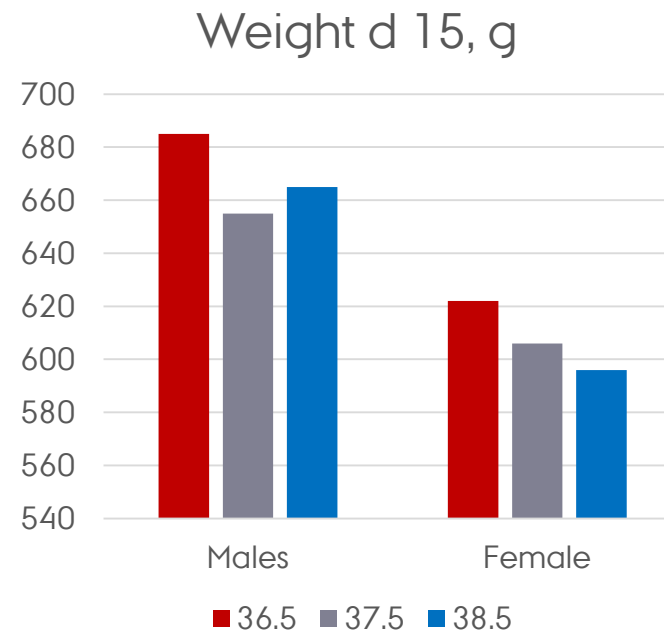
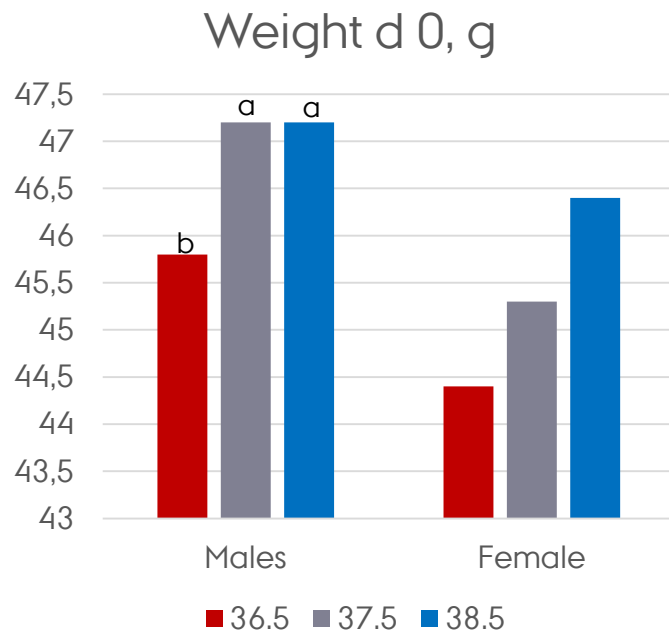


Results – Activity, hatching and sex

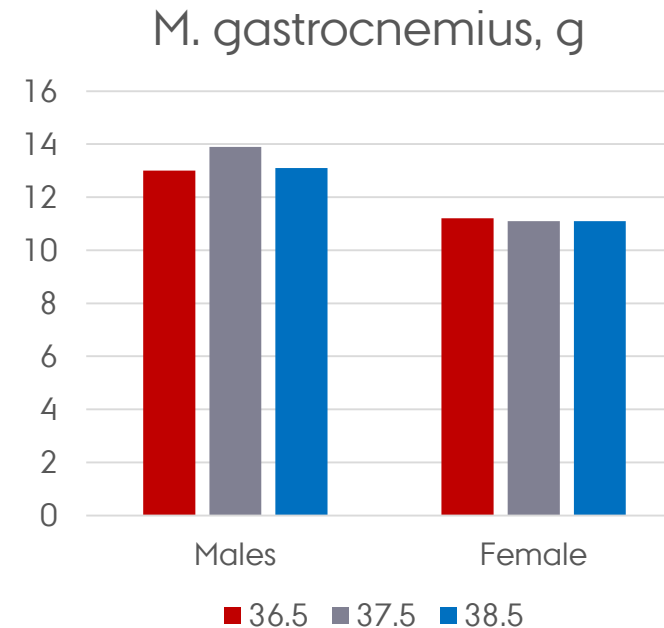
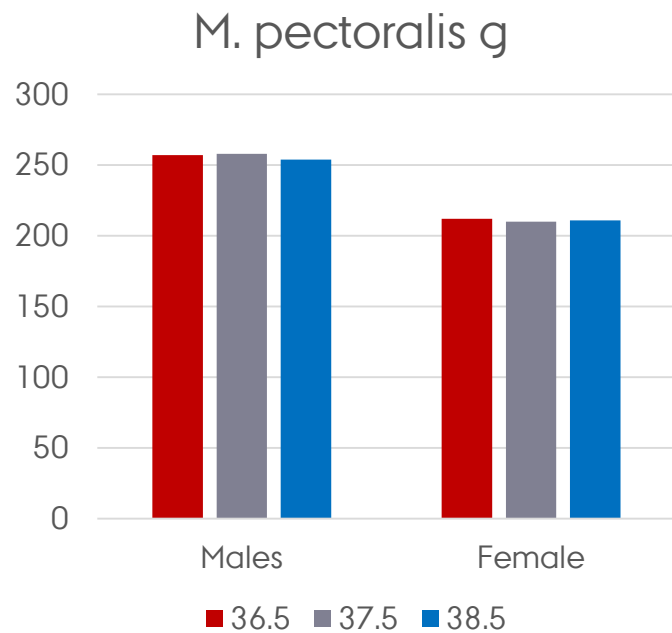
Treatment - temperature	36.5°C	37.5°C	38.5°C
Embryonic activity	Low	Medium	High
Hatching %	88	97	100
Males, %	53	36	37



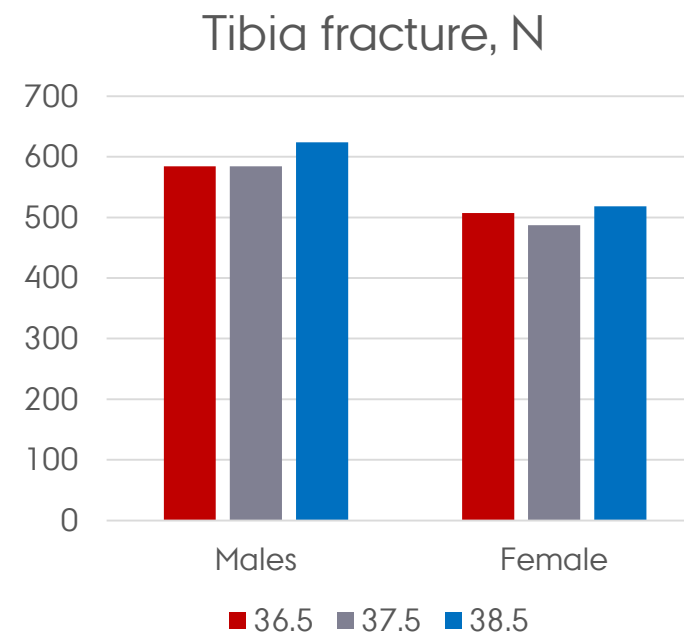
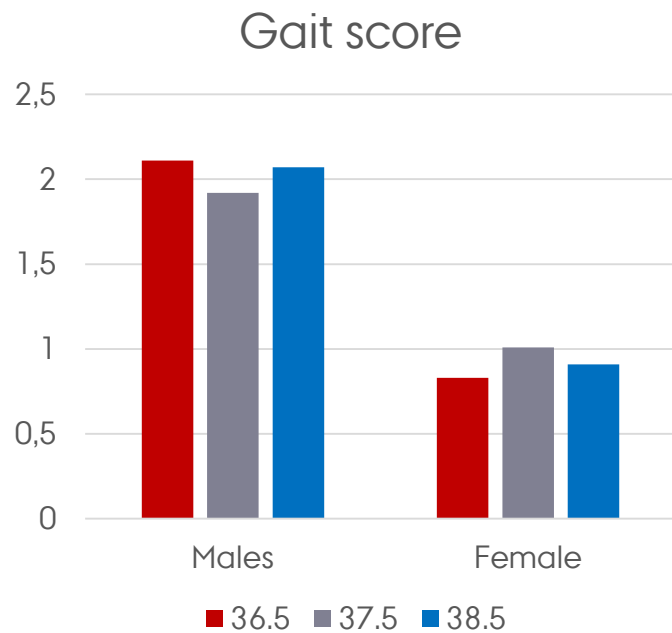
Live weights of chickens 0, 15 and 32 days after hatching



Weights of *M. pectoralis* and *M. gastrocnemius*



Gait score (0-5) and Tibia fracture (N)

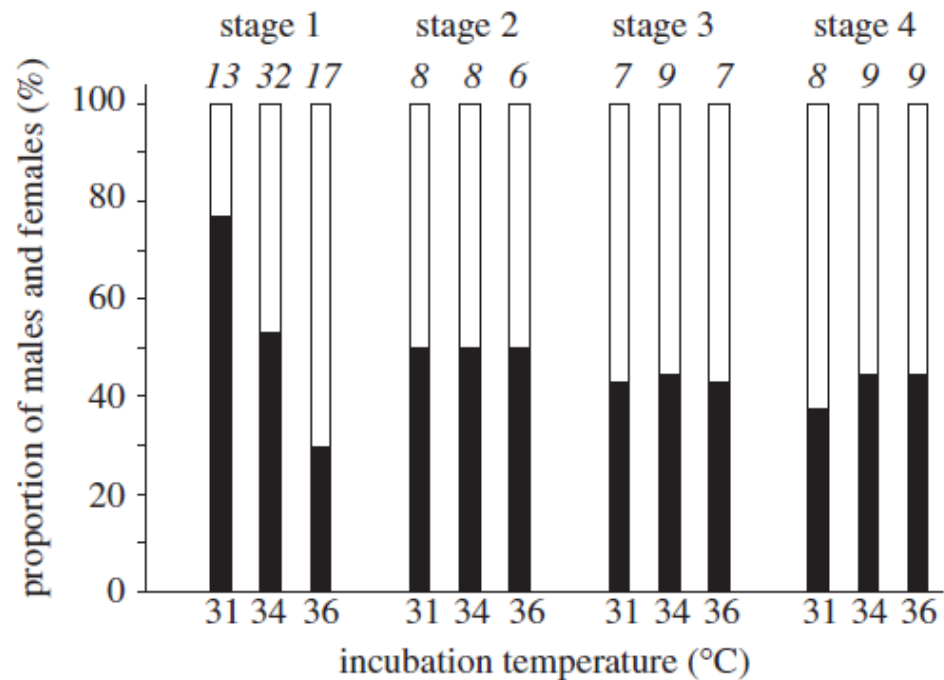


So what happens?

We did see a

- response to the incubation temperature with increased activity with increased temperature at ED-9
- lower weight of chickens exposed to low incubation temperature at hatching – this was not the case later in the growth period
- response of the incubation temperature on the sex distribution of the chicks – more male chickens at low incubation temperature

Australian brush-turkey – incubation in mounds at approximately 34°C but can differ from 30-38°C

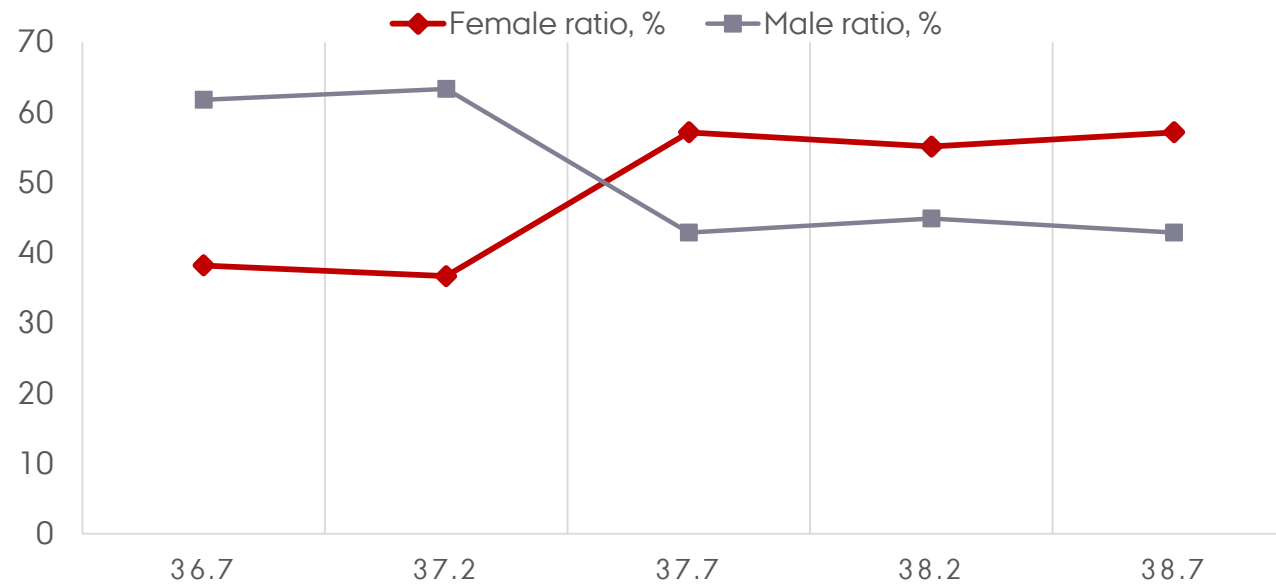


- Stage 1 – young eggs, collected early in incubation
- Black columns – male %
- Low temperature increases proportion of males



Göth and Booth, 2005, Biology letters

Japanese quail chicks – F2 generation of parents incubated at 5 different temperatures, F2 were incubated at 37.7°C



Incubation temperature - indications

Follow up study - better control of temperature in incubators

- Look into effects on muscle development
- Sex distribution – if low temperature is a method to more male chicks – that is beneficial for the industry – **male chicks + 400 g in 32 days!**



Thanks for the attention

Thanks to the technicians at department of Food Science, who were also part of the study

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