



# Early-stage requirements : are we looking at the right angle?

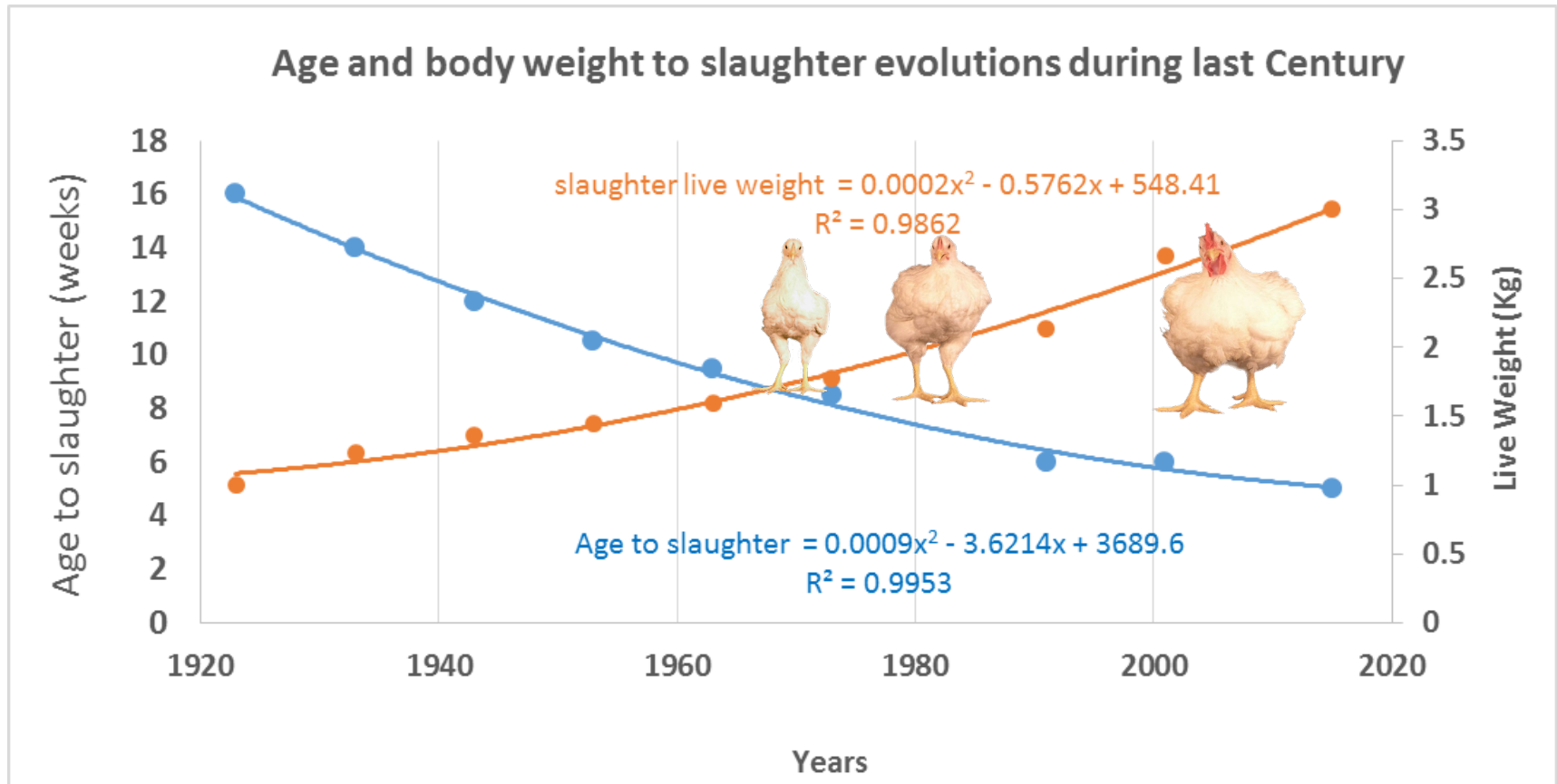
Y. MERCIER PhD

33<sup>rd</sup> CBNA annual Conference

10-11<sup>th</sup> Nov 2022



# The genetic selection is faster than evolution



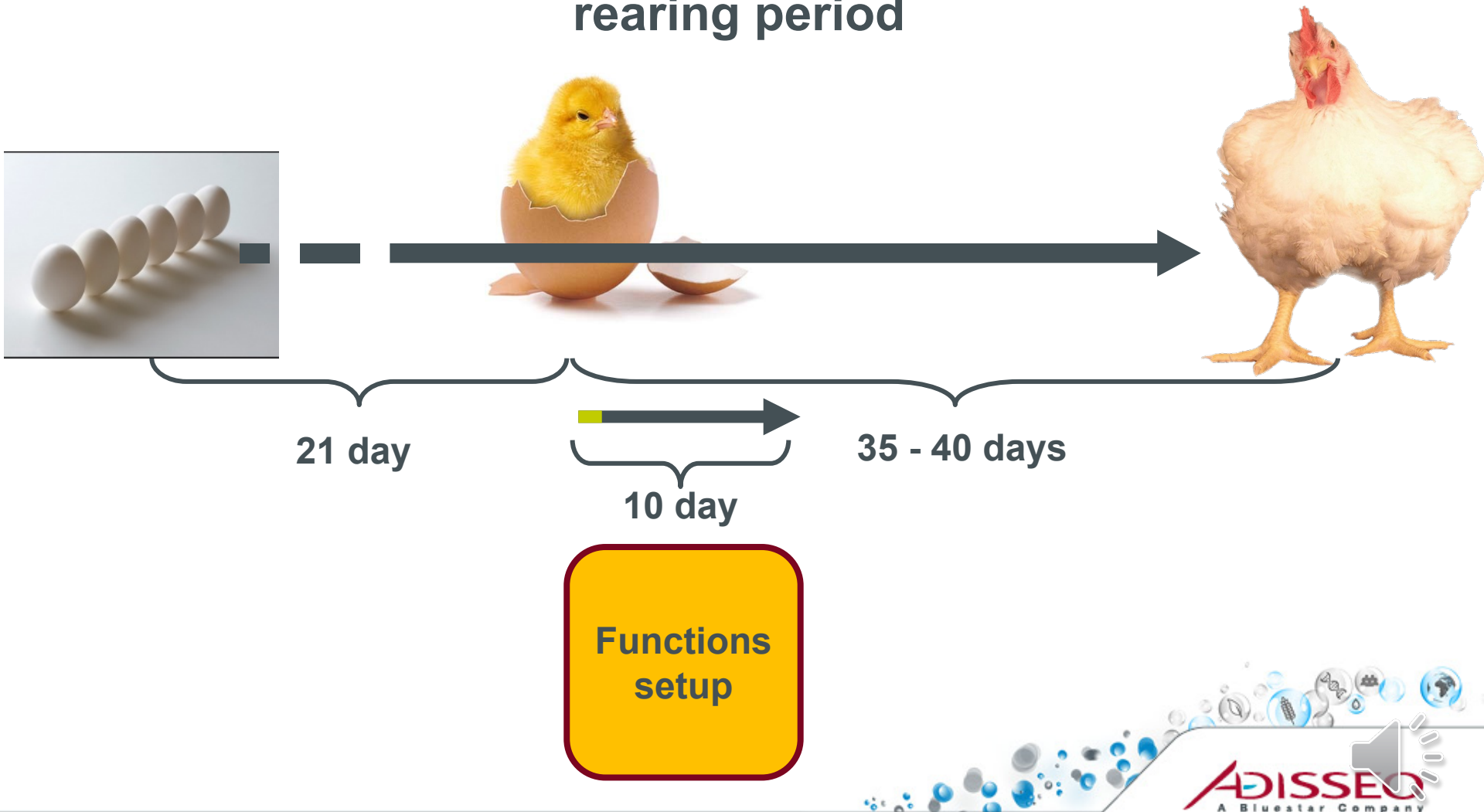
Age to slaughter was divided by 3 and weight to slaughter multiplied by 3

Adapted from Flock et al. 2005



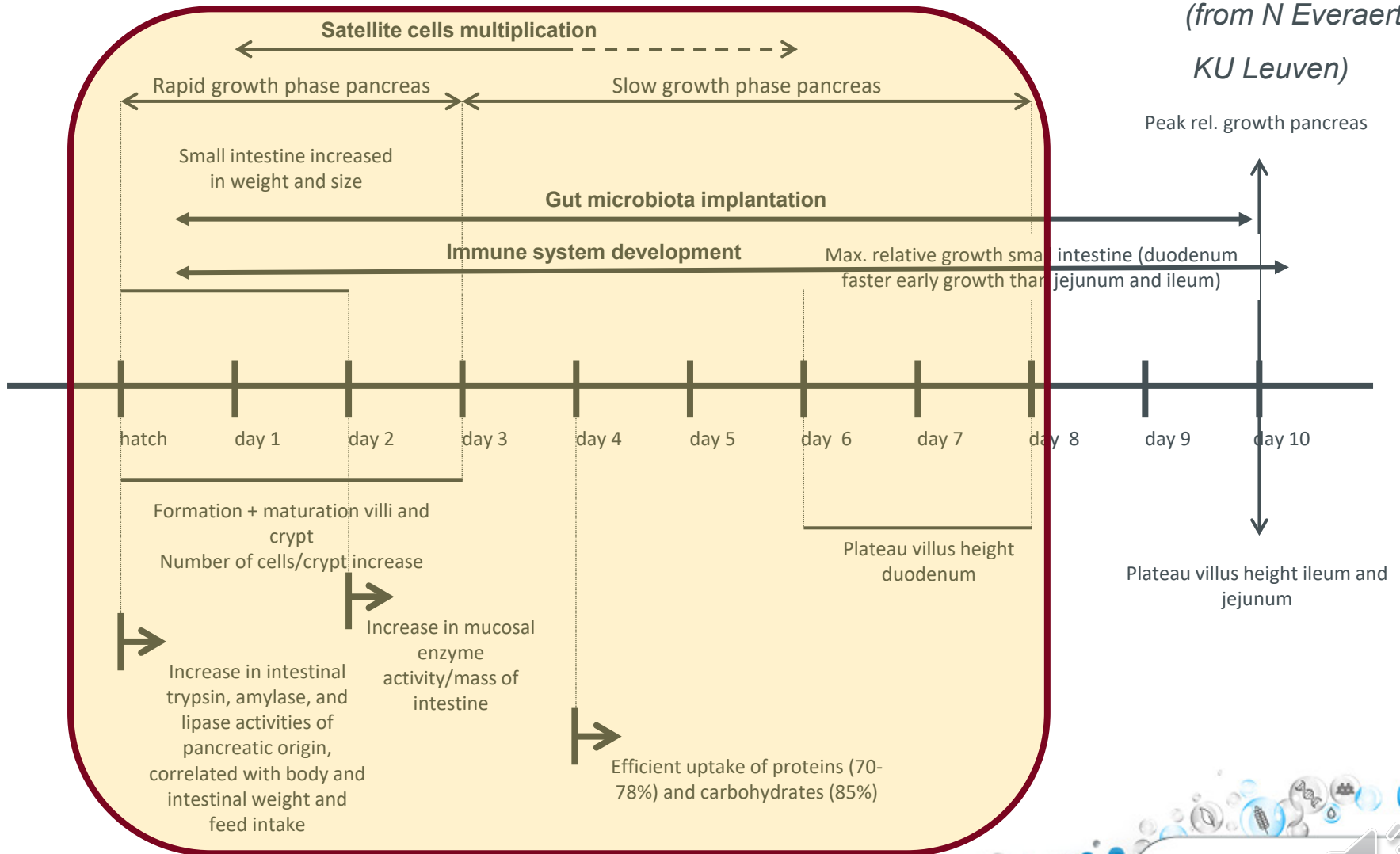
# Relative lifetimes of modern broilers

Today the embryonic period represents 1/3 of the life cycle and starting phase represents around 1/4 of the whole rearing period



# Key events of early development during the first 10 days

(from N Everaert  
KU Leuven)

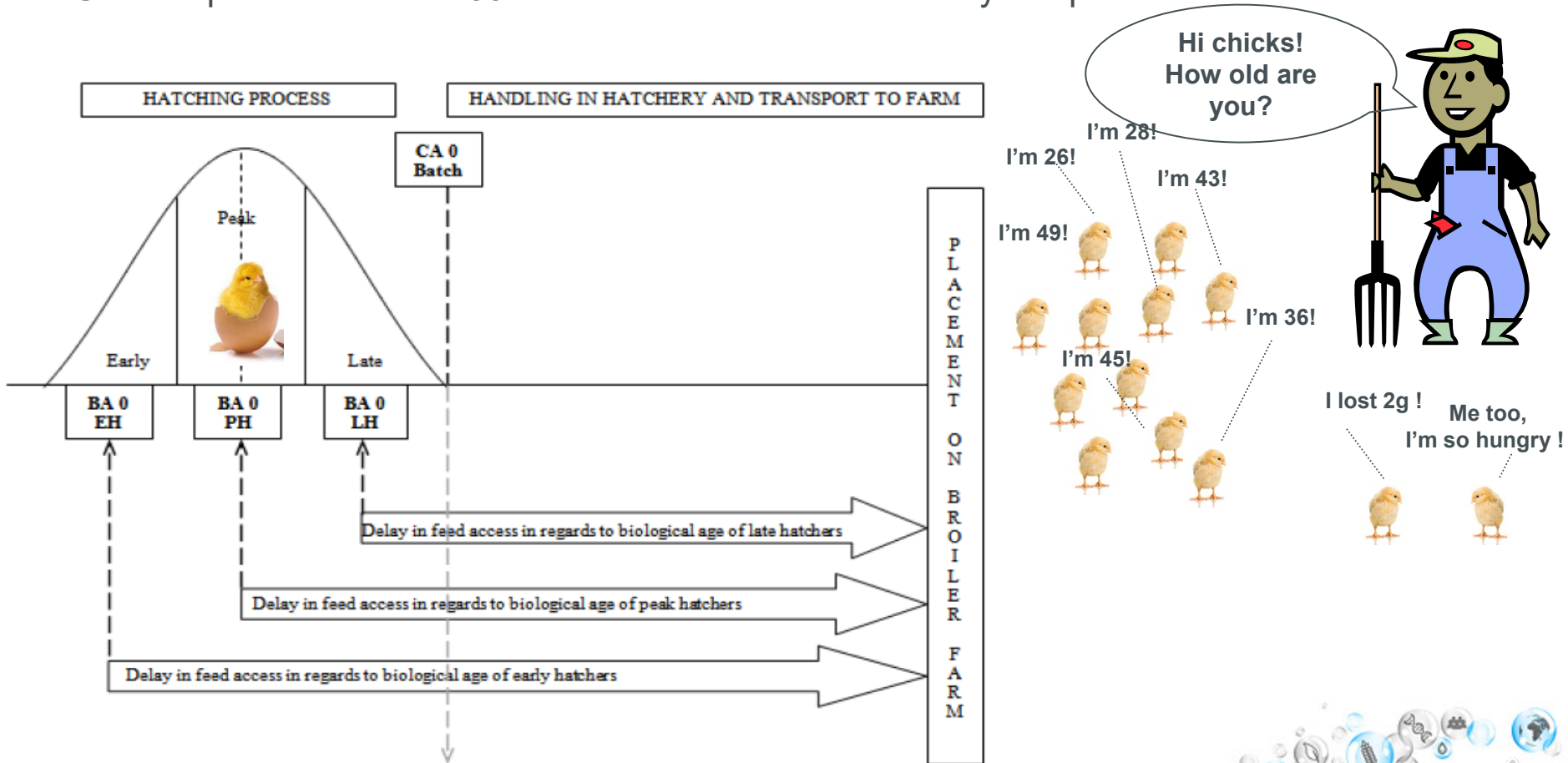


**First week is critical for functions setup**



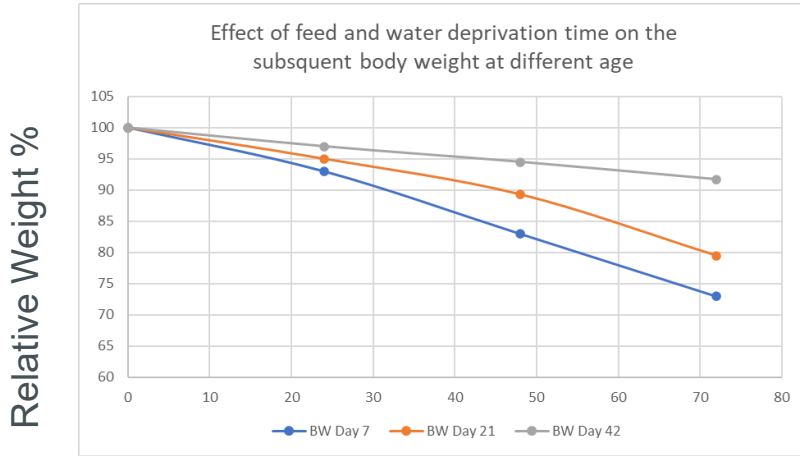
# From hatcheries to farm

- Chicks' hatch over a 24 to 36 h period and chicks are held in the incubator until a large percentage of the birds have hatched
- Chicks spend from 24 to 60 h without feed or water till they are placed in the farm

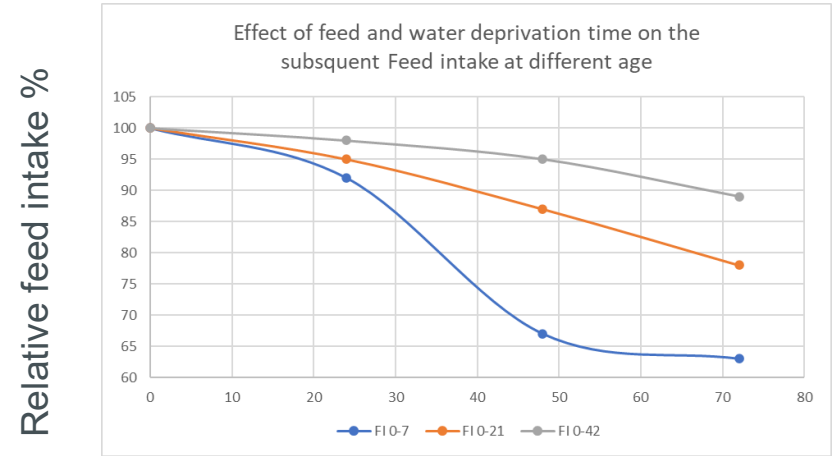


# Effect of the duration of feed and water deprivation

Meta analysis results on the duration of feed deprivation on long term performance (de Jong et al. 2017)



Hours of feed & water retardation



Hours of feed & water retardation

- After 48 hours of feed deprivation market body weight can be impacted up to 5 to 8 % mainly driven by feed intake drop !
- FCR is impacted only after a deprivation longer than 72 hours.
- Mortality increased by 56% after 48 hours deprivation
- Organs' weight and development retardation appeared mainly before 21 days old
- No significant effect on yolk sac resorption



## Impact of Breeder age and fasting on growth performance

- Breeder age influence greatly and positively the broiler performances during early stage.
  - Feed intake is positively affected by breeders' age on the whole growing period leading to numerical improved weigh gain at slaughter.
  - FCR is not impacted by breeders' age.

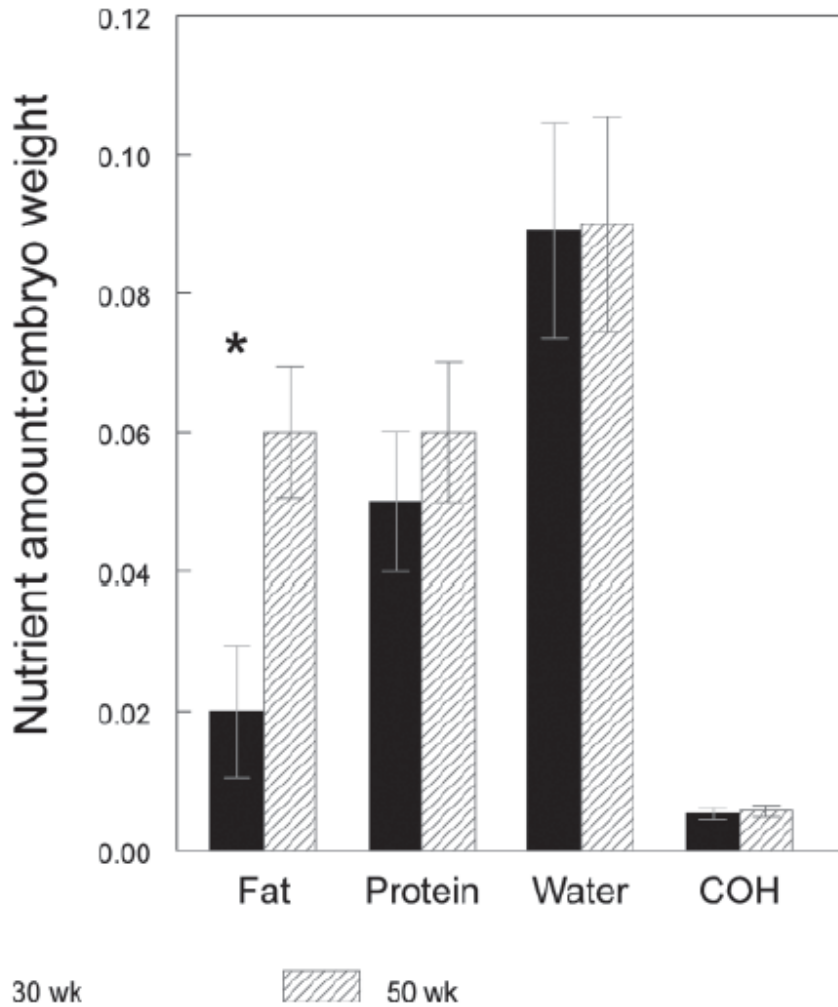
Feeding phase	Feed intake		Body weigh gain	
	30 Wk	60 Wk	30 Wk	60 Wk
0-10	226 a	240 b	159 a	171 b
11-21	713	741	505	519
21-35	1983	2050	1123 a	1218 b
36-42	1391	1425	715	666
total	4313 a	4456 b	2503	2575

Adapted from Vargas *et al.* 2009

- Fasting period didn't show more impacting effect on younger breeder chicks compared to older one.



# Yolk sac composition at hatch depend on breeding hens' age.



Fat content relative to embryo/chick weight at hatch is affected by age of breeder hens specifically for fat content.

The relative fat yolk sac content difference Represent for respectively 42 and 45 g chick 0,84 g vs 2,7 g

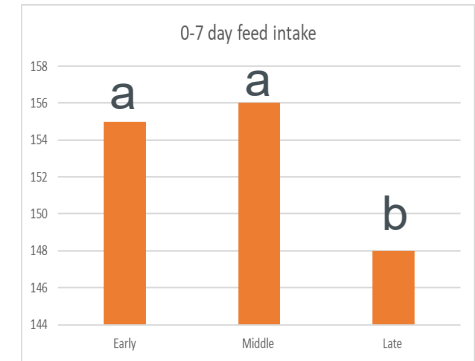
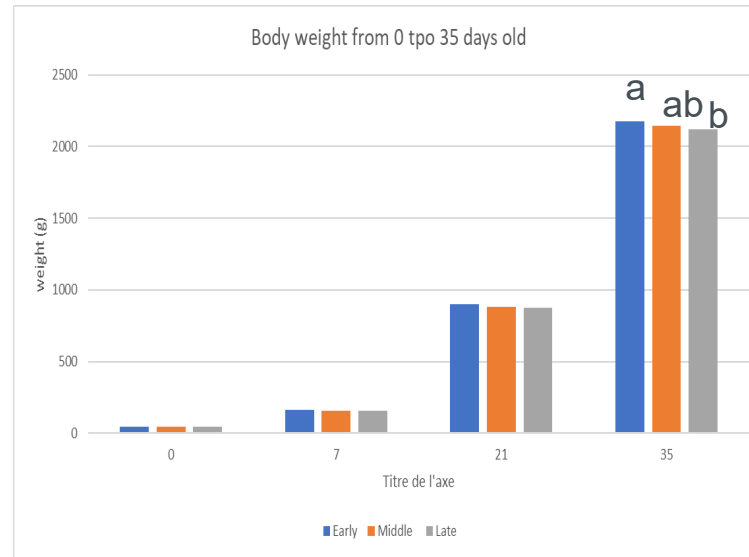
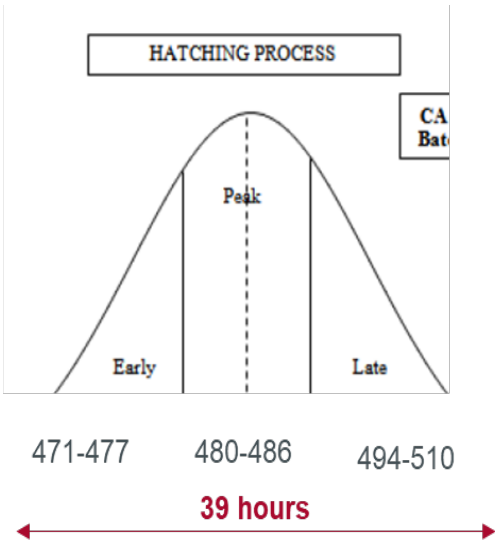
This can be also considered as energy difference from 7,14 to 23 KCal for start !  
Considering 8 g of intake in the first day yolk energy supply is 30% to 90%

How do we consider these difference in Pre-starter feed ?



# Effect of hatching time on further growth

Özlü *et al.* 2018



Breeder hens of 55 week of age

Body weight appeared higher with early hatch chicks compared to late hatched birds.

Early hatched birds appeared also as the more efficient for yolk sac uptake.

Feed intake of early and middle hatched birds appeared significantly higher than the late hatched.



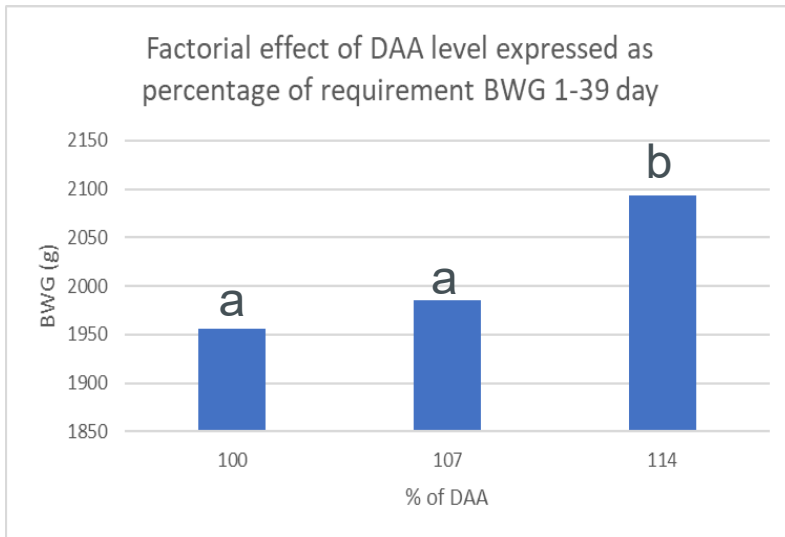
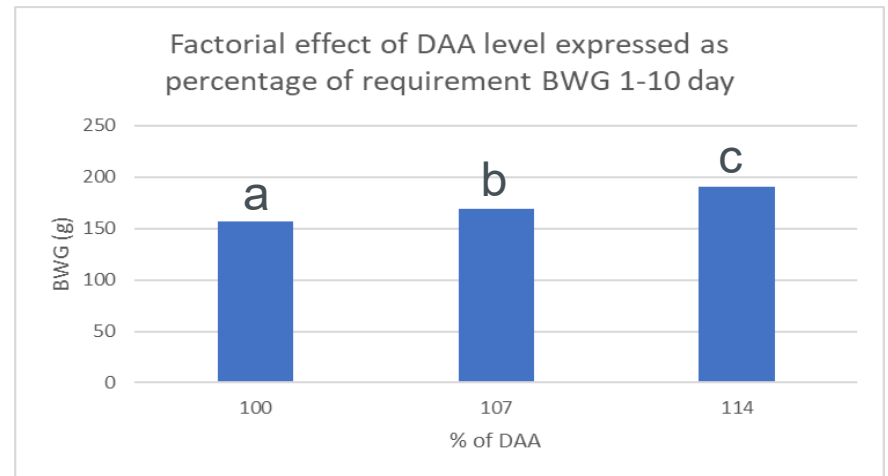
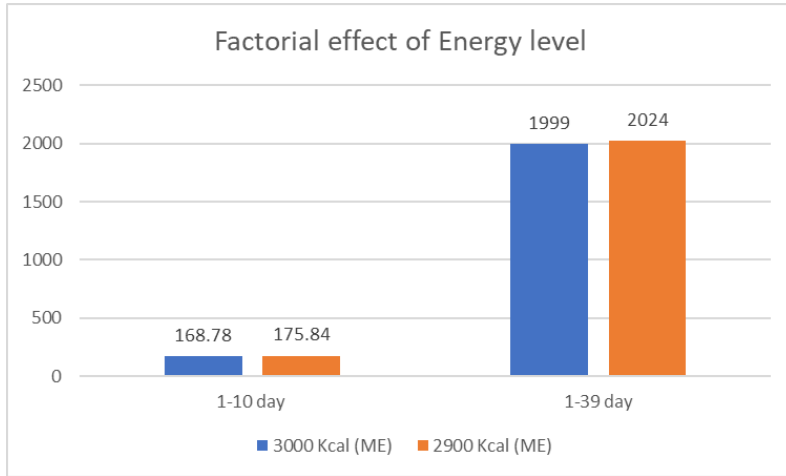
# Effect of increasing AA levels in early phase on further growth

CP levels : 21,4 ; 23 and 24,6

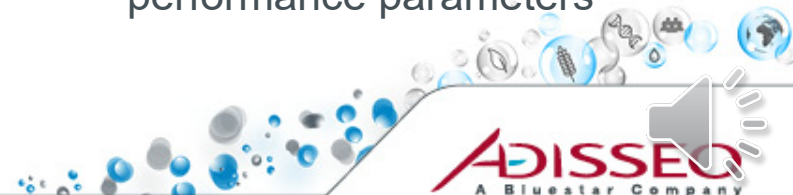
DLys level : 1,19 ; 1,28 and 1,37 (or 100, 107 & 114 % of Req.)

ME 3000 or 2900Kcal

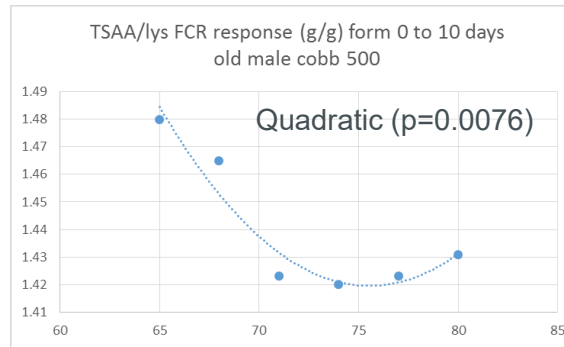
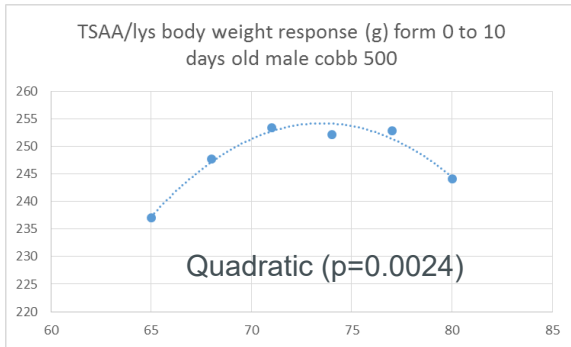
Ivanovich et al. 2017



- Increased DAA up-to 114% of the requirement allowed improving BWG at short and long term.
  - No effect on F.I. nor on FCR
  - No effect of ME level what ever the performance parameters



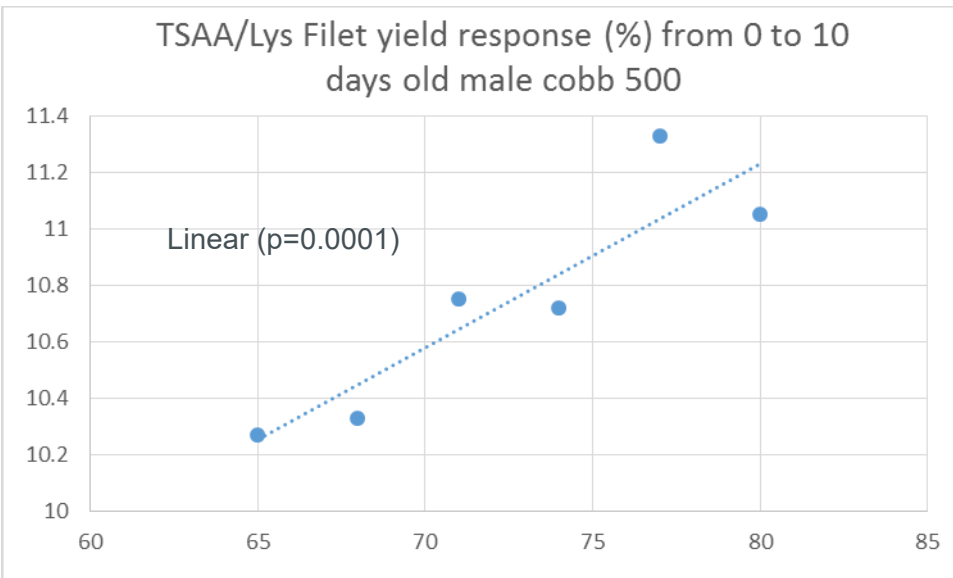
# TSAA requirement of broilers at start



**Classical responses for BWG and FCR lead to classical TSAA/lys level 0.74-0.76**

**Looking at breast development the response is up of 0.8 !**

**Is higher TSAA level improved satellite cells multiplication in early stage ?**



Pessoa *et al.* 2012



## Increasing Protein or specific Amino Acids for function setting ?

- Depending on the AA balance in these experiments, different responses were obtained.
- Do we have to focus on increasing AA globally or specifically during early stage of life ?
  - Alanine and Glutamine is reported for improving gut development
  - Leucine and Methionine as triggering protein synthesis
  - Tryptophane involved in serotonin and feed intake regulation
- Is weight gain at day 7 or 10 the only parameter to target for early stage?



## Take home messages

- The relative live time of modern broilers is getting so short that early-stage management cannot be ignored
- Practices at breeders' level, and hatchery level are sometime not known and difficult to anticipate
- Placement time and delay in feed access is crucial for implementing function development and further growth performances.
- Feed intake seems to be one of the more influent/limiting parameter in nutrients supply at early stage.
- Protein and amino acids supply appeared as a good lever for early dietary intervention.
- Early-stage AA acids requirement should be more considered as functions than early weight.

