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The key to your profit!

Impact of rearing body weight on egg size

H&N Academy North America - 2021

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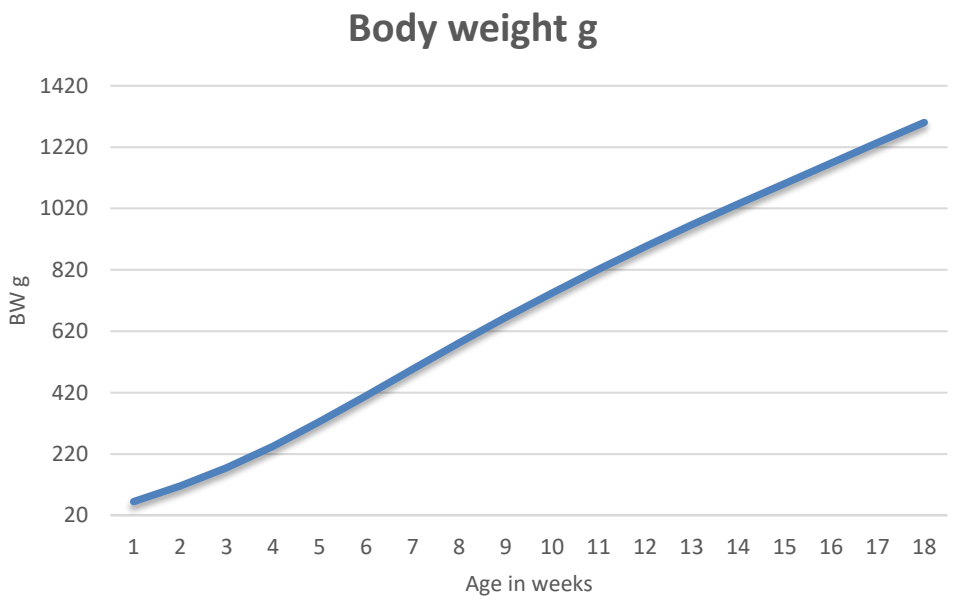
Global Technical Service

Outline

1. Little bit of history of the research done.
2. Body development during rearing.
3. Impact of BW on performance parameters.
4. KPIs ↔ body weight during rearing.
5. What to do to get the egg size we want.

In the past: linear body development in rearing



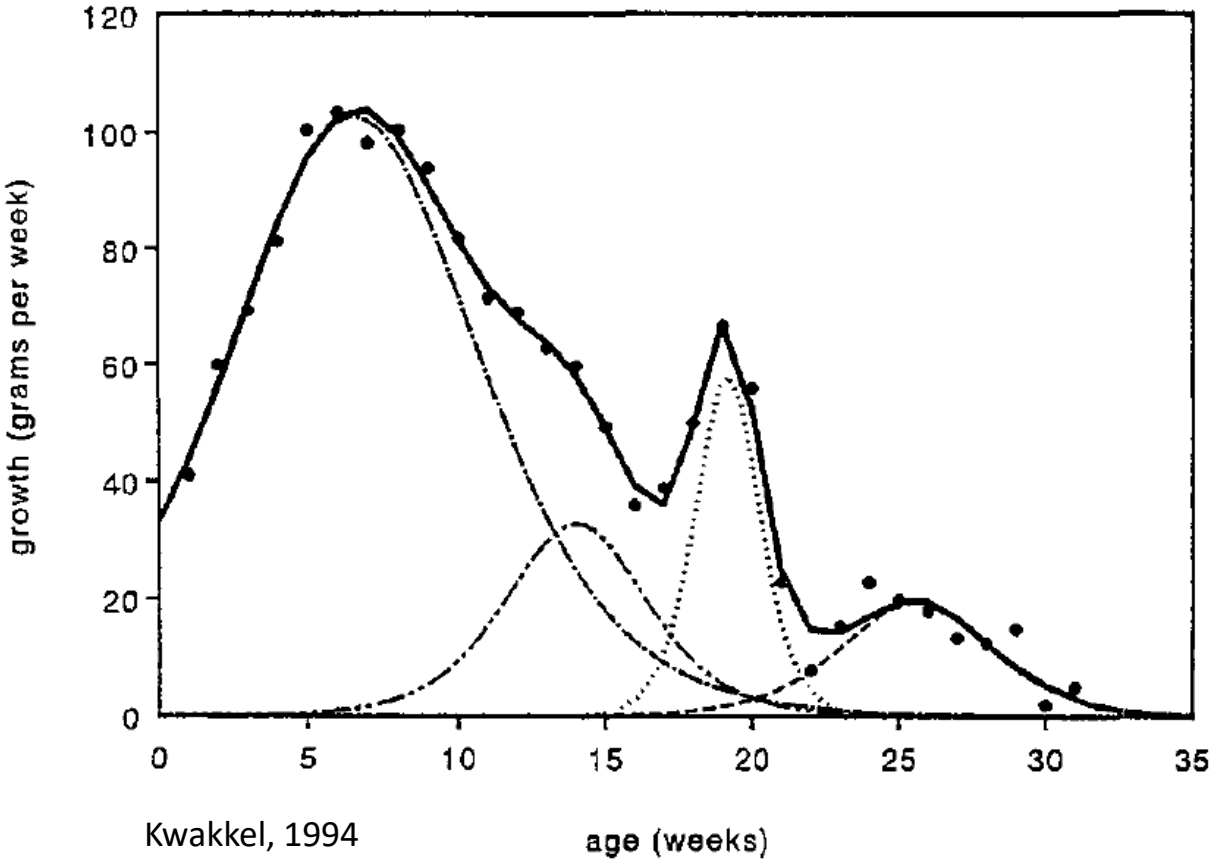
H&N Management guide, 2019

- Linear growth and development of the different tissues.
- This drove different feeding regime in the past.
- It was thought that late rearing was the most important period.
- Close to production onset.
- Diets change by age.

A big step forward!

- In 1986 Lessons and Summers suggested that feed regimes should be based on **diet/body weight** instead of diet/age changes.
- Dietary changes should take place only if a certain physiological age defined as body weight was achieved.
- Nutritional programs for pullets should be adjusted to consider the stages of development of important body structures

Multiphasic growth (Kwakkel, 1994)

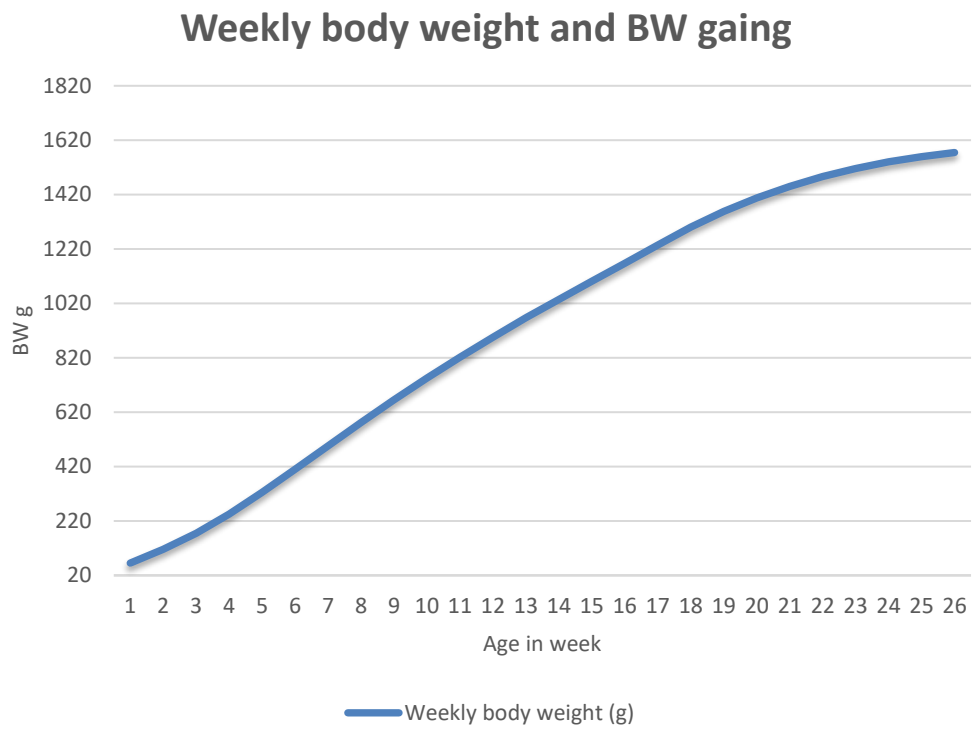


Kwakkel, 1994

1. Crude protein: Muscles, organs, feathers, etc.
2. Crude fat: functional and abdominal fat.
3. Ash: skeleton and then medullary bone

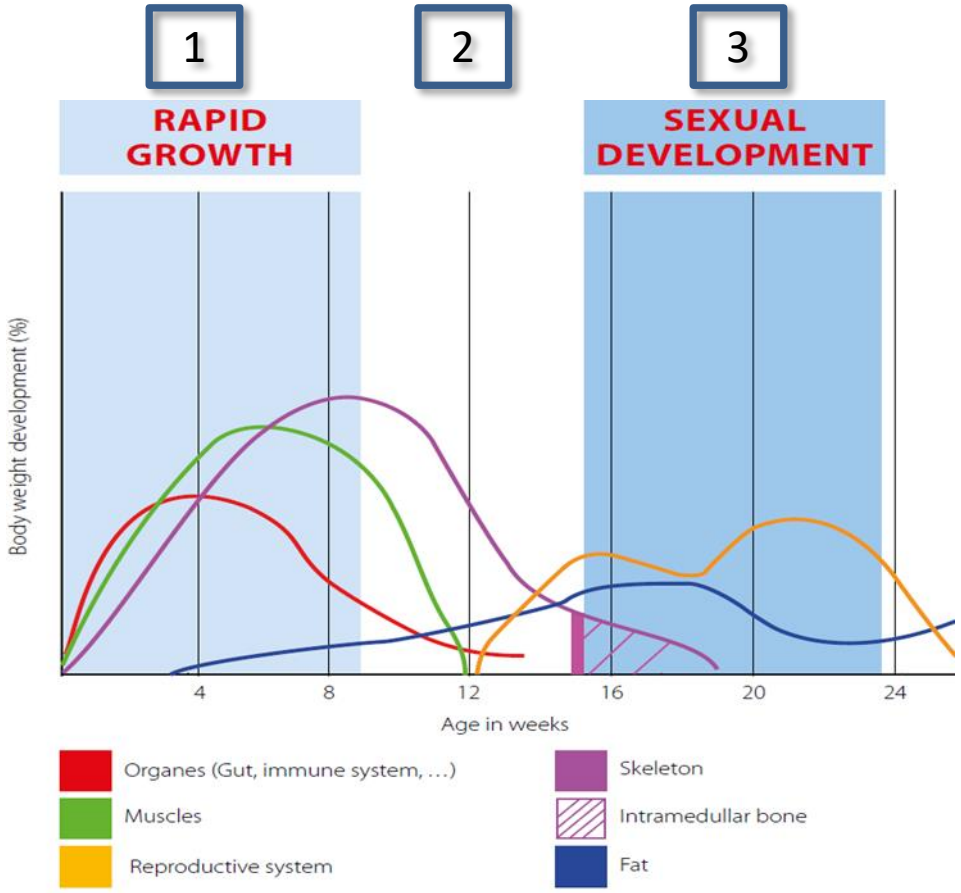
- The critical periods should be identified, and, as a consequences the optimal nutrition for those stages defined.

Research helped to move from a linear body development to…



Adapted from H&N Management guide, 2019

a multiphasic growth in rearing.



- Diets matching the body development: starter, grower and developer.

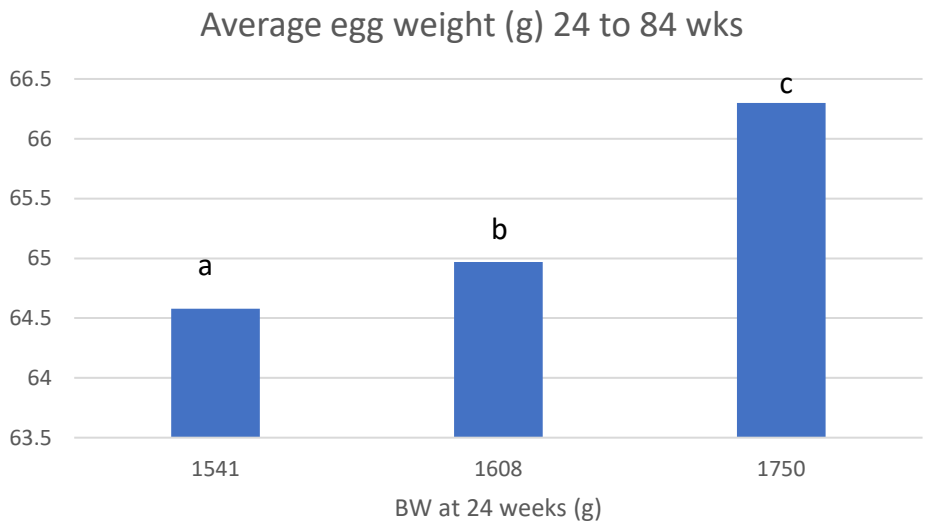
H&N Management guide, 2019

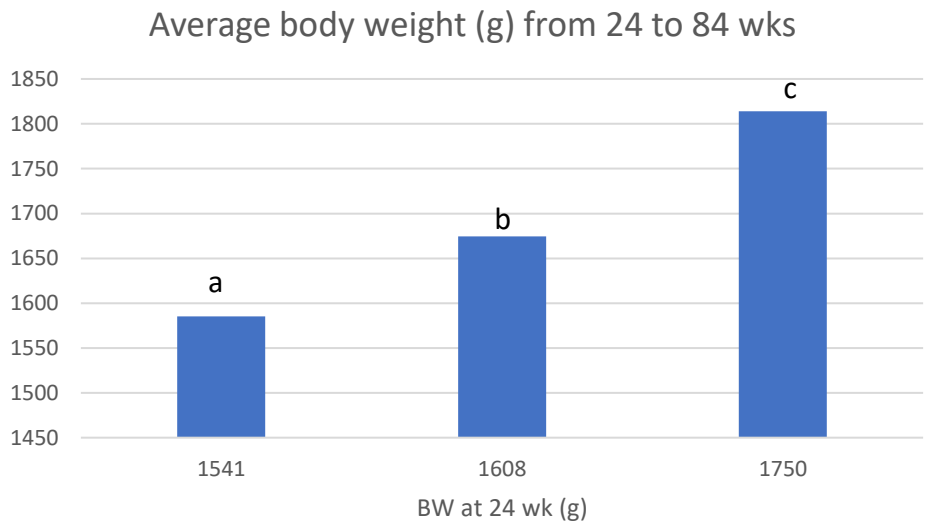
What is the most critical age in rearing?

1. 5 weeks
2. 8 weeks
3. 12 weeks
4. 16 weeks

Body weight at 24 weeks: egg weight and body weight in production (Lacin et al., 2008)

24 wk





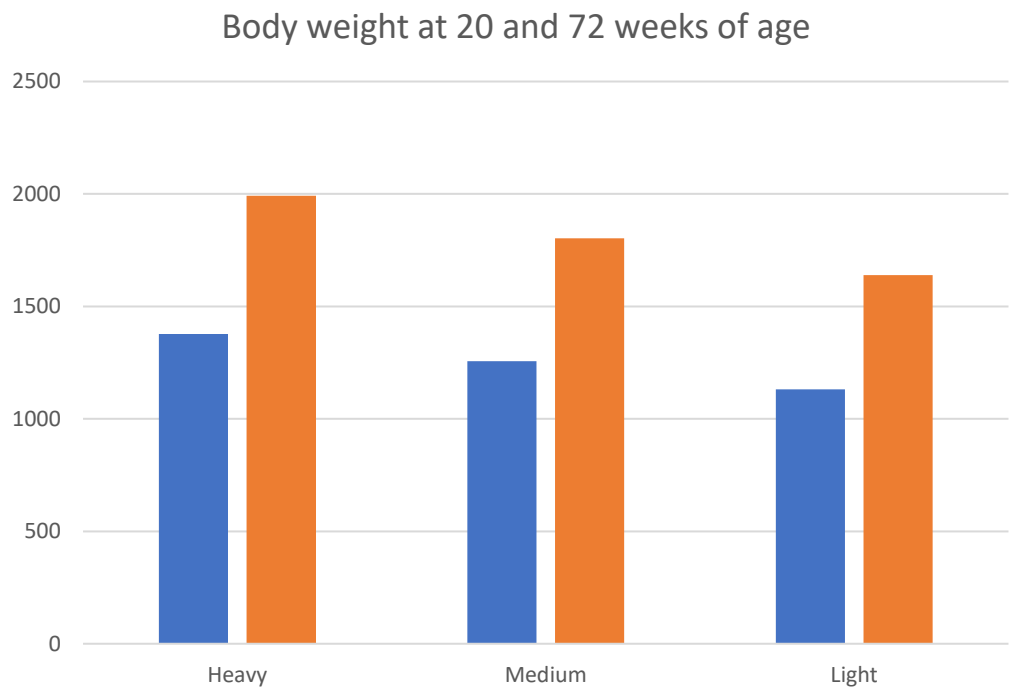
Lacin et al., 2008. p< 0,005

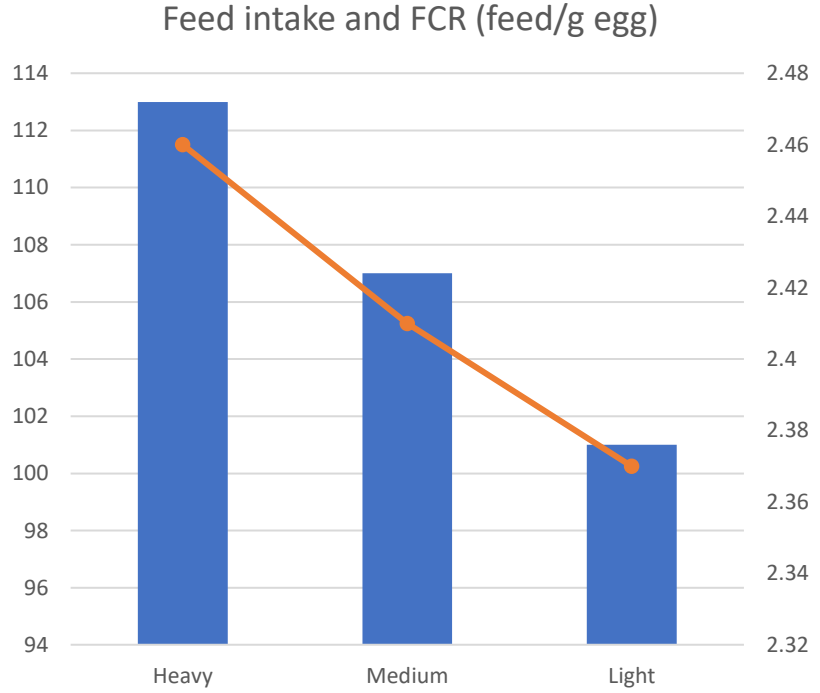
- This study showed how important is body weight and its influences on some important parameters of laying performance as egg weight.

Body weight at 20 weeks of age and performance (Bish et al., 1983).

24 wk

20 wk





Treatment	Body weight (g) at 20 wk	Body weight (g) at 72 wk	Egg weight (g)	Age at 50% production (days)	% Hen day production	Feed intake (g)	FCR
Heavy	1377[a]	1992[a]	61,5[a]	172	75,1	113[a]	2,46[a]
Medium	1256[b]	1803[b]	59,8[b]	169	74,7	107[b]	2,41[ab]
Light	1131[c]	1639[c]	59,8[b]	171	75,2	101[c]	2,37[b]

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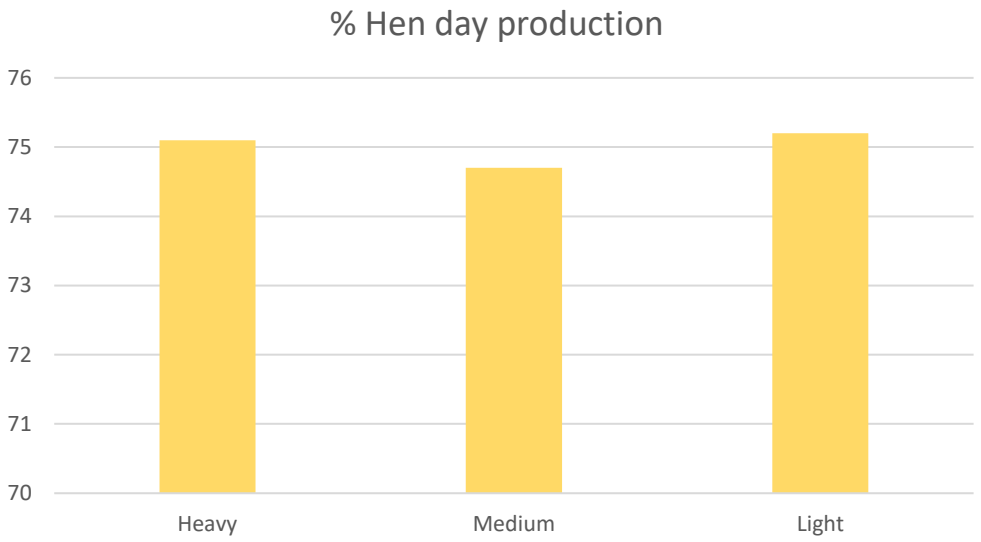
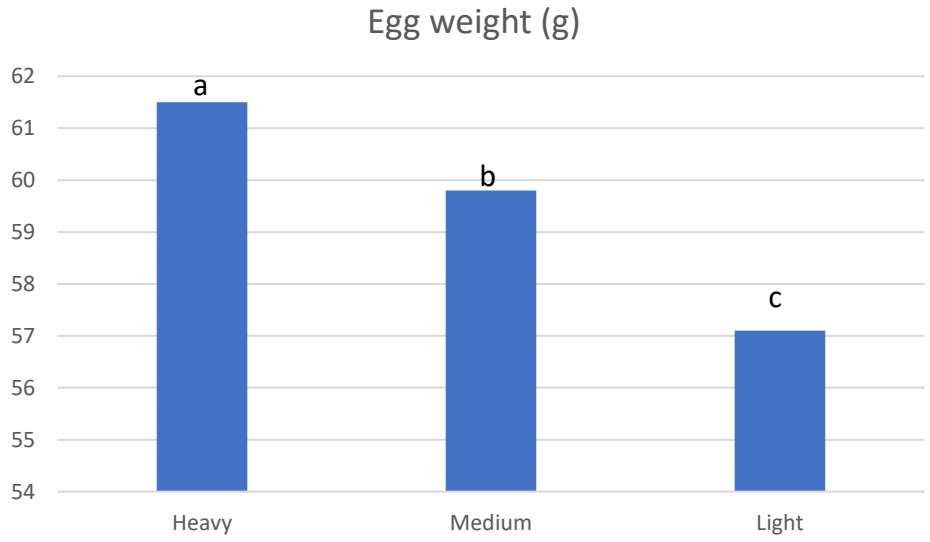
Body weight at 20 weeks of age and performance (Bish et al., 1983).

24 wk

20 wk





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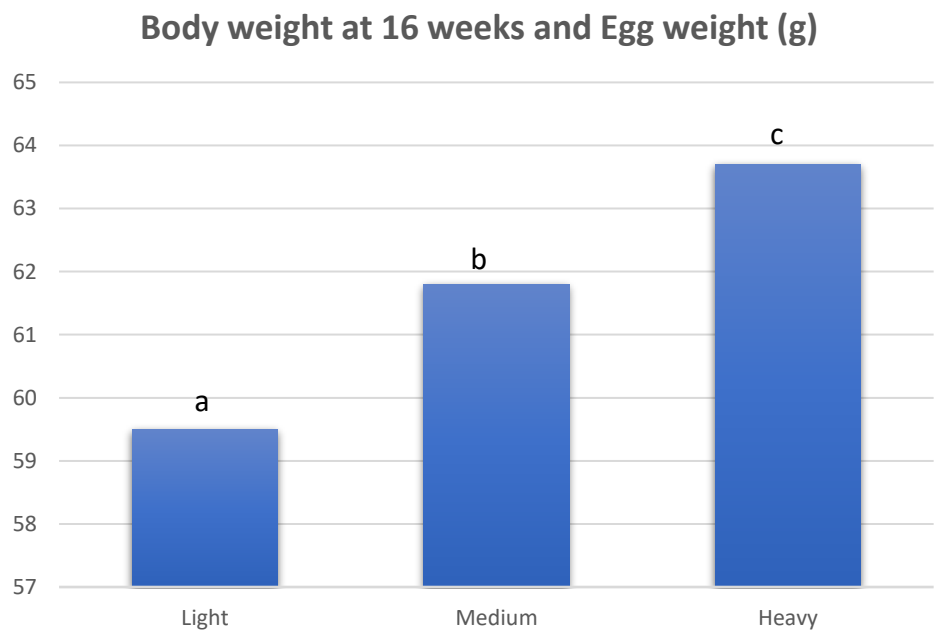
Effect of Body weight at 16 weeks and egg weight (Suawa, 2015).

- At 16 weeks of age (Brown):
  - Light: 1,170 kg
  - Medium: 1,337 kg
  - Heavy:1,507 kg

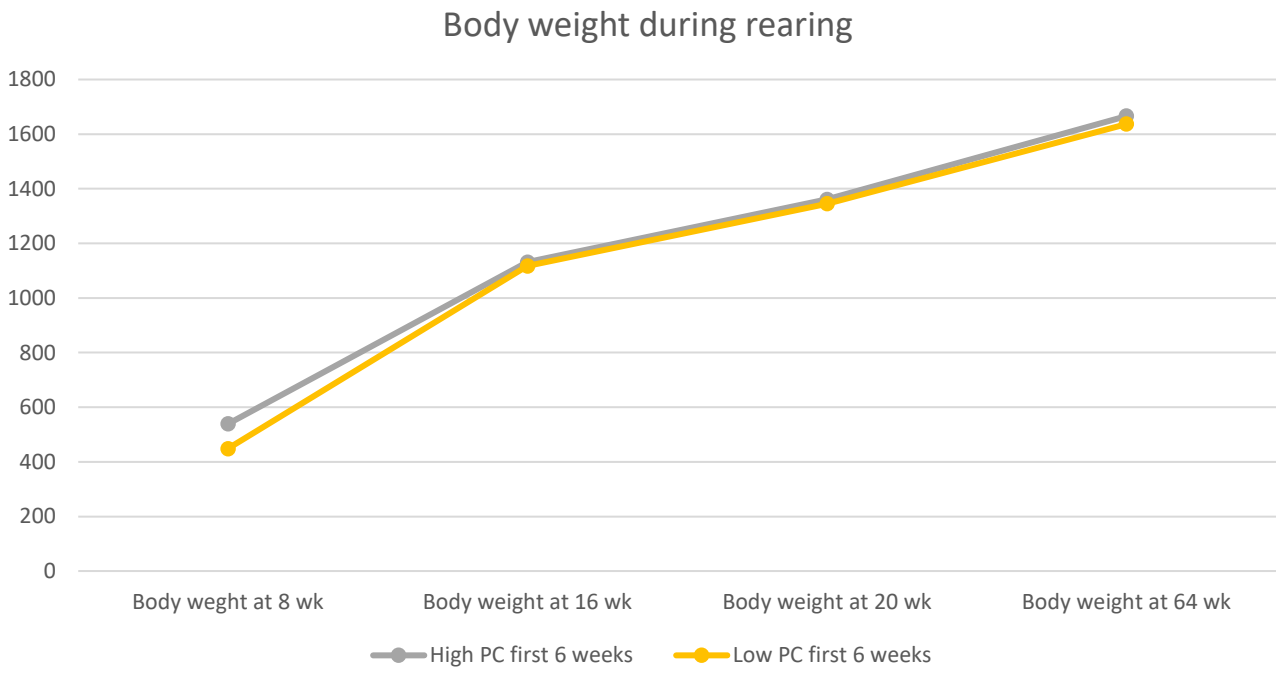
- Average egg weight until 80 weeks.



Suawa, 2015. $p < 0,05$

24 wk
20 wk
16 wk

6 weeks: Impact of low protein level in rearing (Coon et al., 1991)



- Low vs high (optimal) level of protein 0 to 6 weeks. Then 6 to 18 normal diets.
- Impact on body weight at 8 weeks ($p < 0,05$).
- No differences at 16, 20 and 64 wk.

24 wk
20 wk
16 wk
6 wk

Adapted from Coon et al., 1991.

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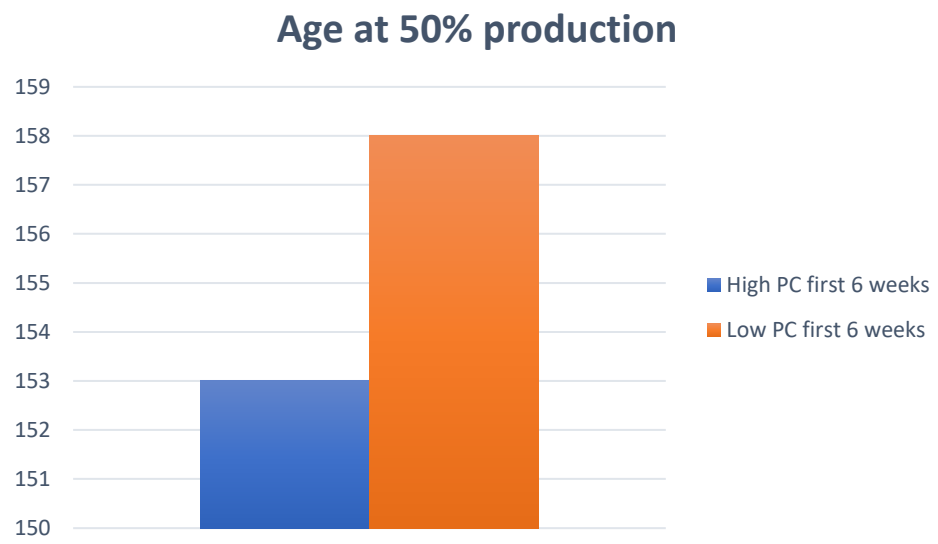
6 weeks: Impact of low protein level in rearing (Coon et al., 1991)



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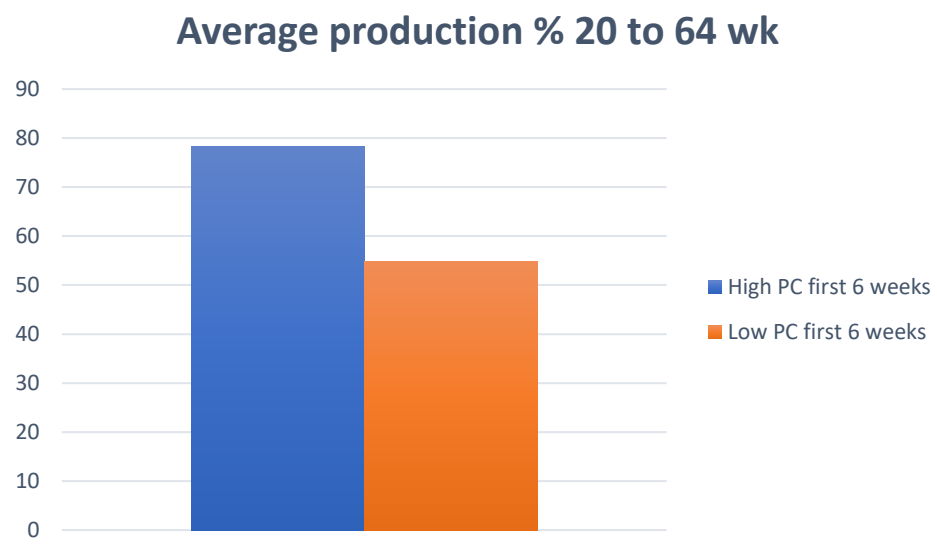

Adapted from Coon et al., 1991.

- Significant difference (p<0,05)

24 wk
20 wk
16 wk
6 wk

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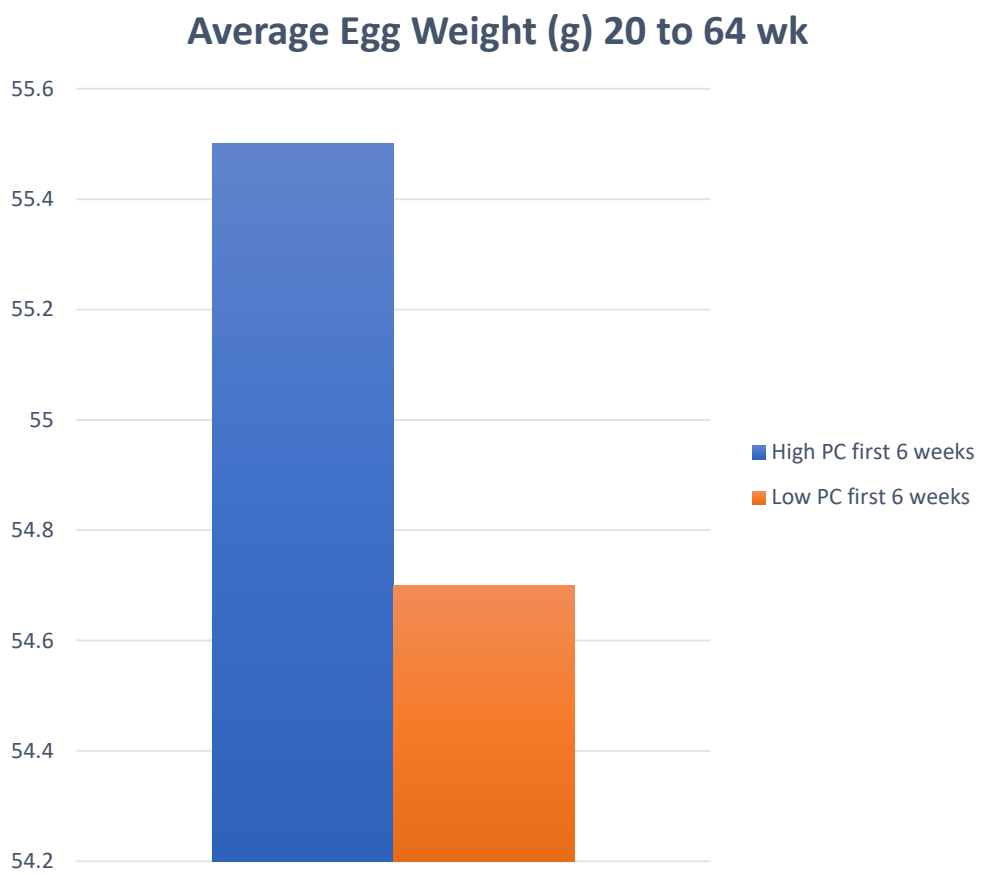
6 weeks: Impact of low protein level in rearing (Coon et al., 1991)



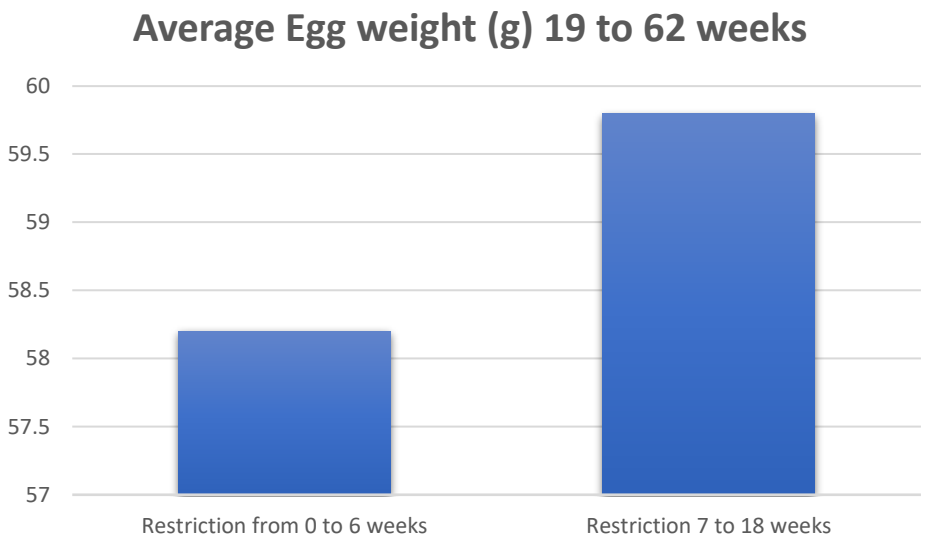
Adapted from Coon et al., 1991. p<0,05

- Low protein diet first 6 weeks → smaller egg in production.

24 wk
20 wk
16 wk
6 wk

Effect of restriction in two different periods in rearing on egg weight (Kwakkel, 1994).

- Restriction based on feed or lysine.
- Early feed restriction (nutrients or intake) impact on body development, skeleton size, organs and egg size.



Kwakkel, 1994. $p < 0,05$

24 wk
20 wk
16 wk
6 wk

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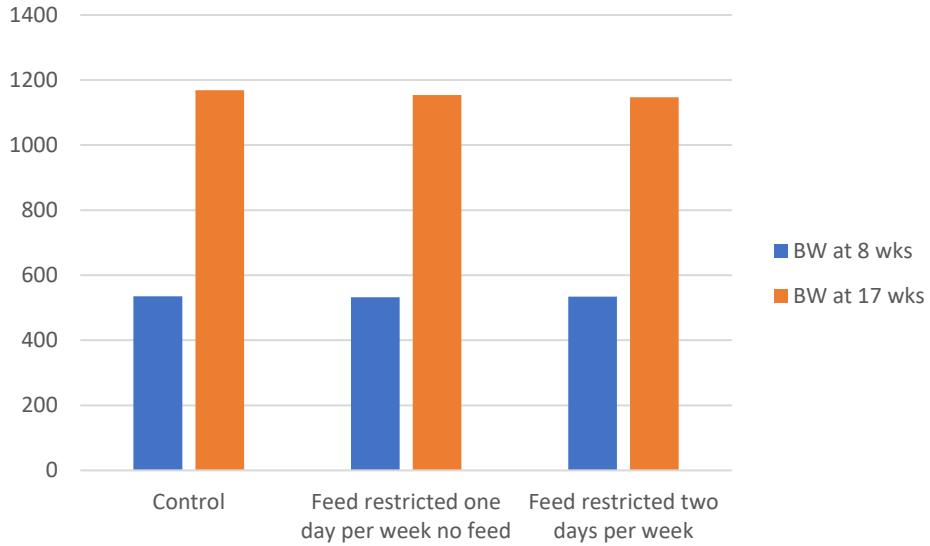
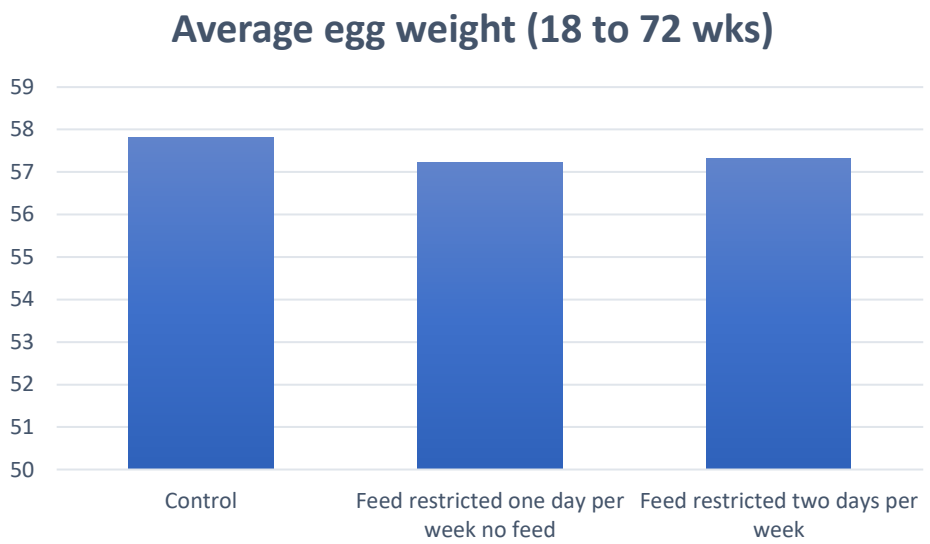
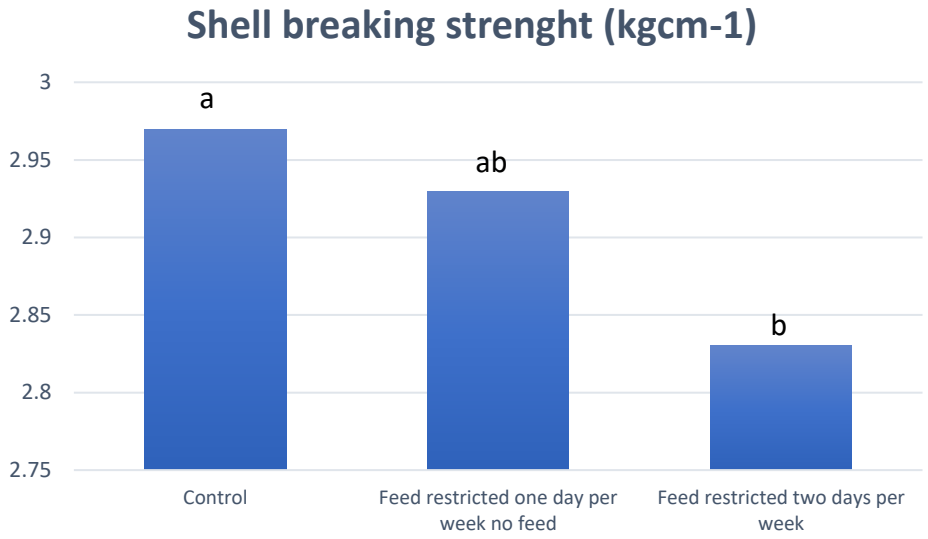
Restriction from 8 until 17 weeks of age (Sarica et al., 2009)

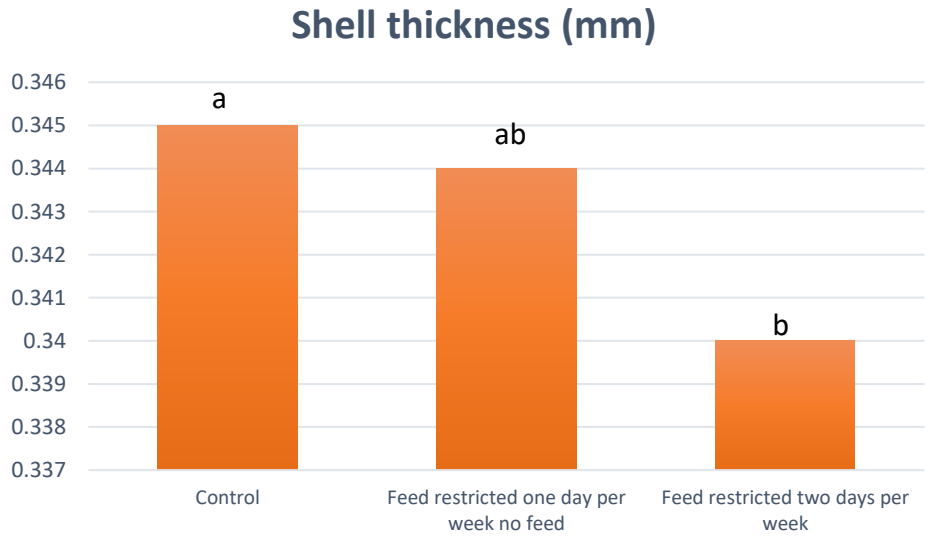




- Restriction of feed intake didn't impact on body weight or egg weight when done after 8 weeks of age.

Restriction from 8 until 17 weeks of age (Sarica et al., 2009)

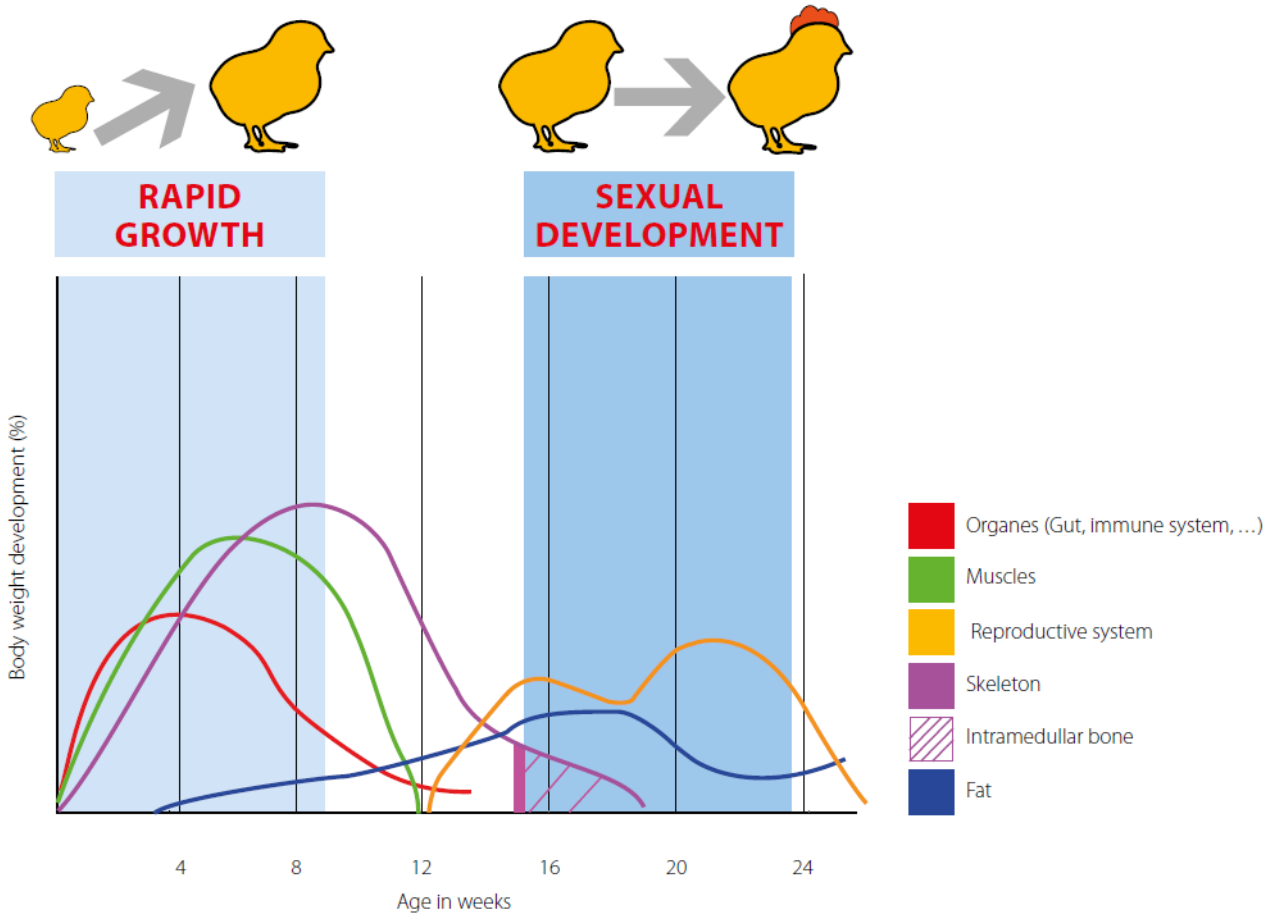




Treatment	Shell breaking strenght (kgcm-1)	Shell thickness (mm)
Control	2,97[a]	0,345[a]
Feed restricted one day per week no feed	2,93[ab]	0,344[ab]
Feed restricted two days per week	2,83[b]	0,340[b]

- It did have an impact on eggshell quality.
- Skeleton and medullary bone development.

Body weights and uniformity



H&N Int. Management guide, 2019.

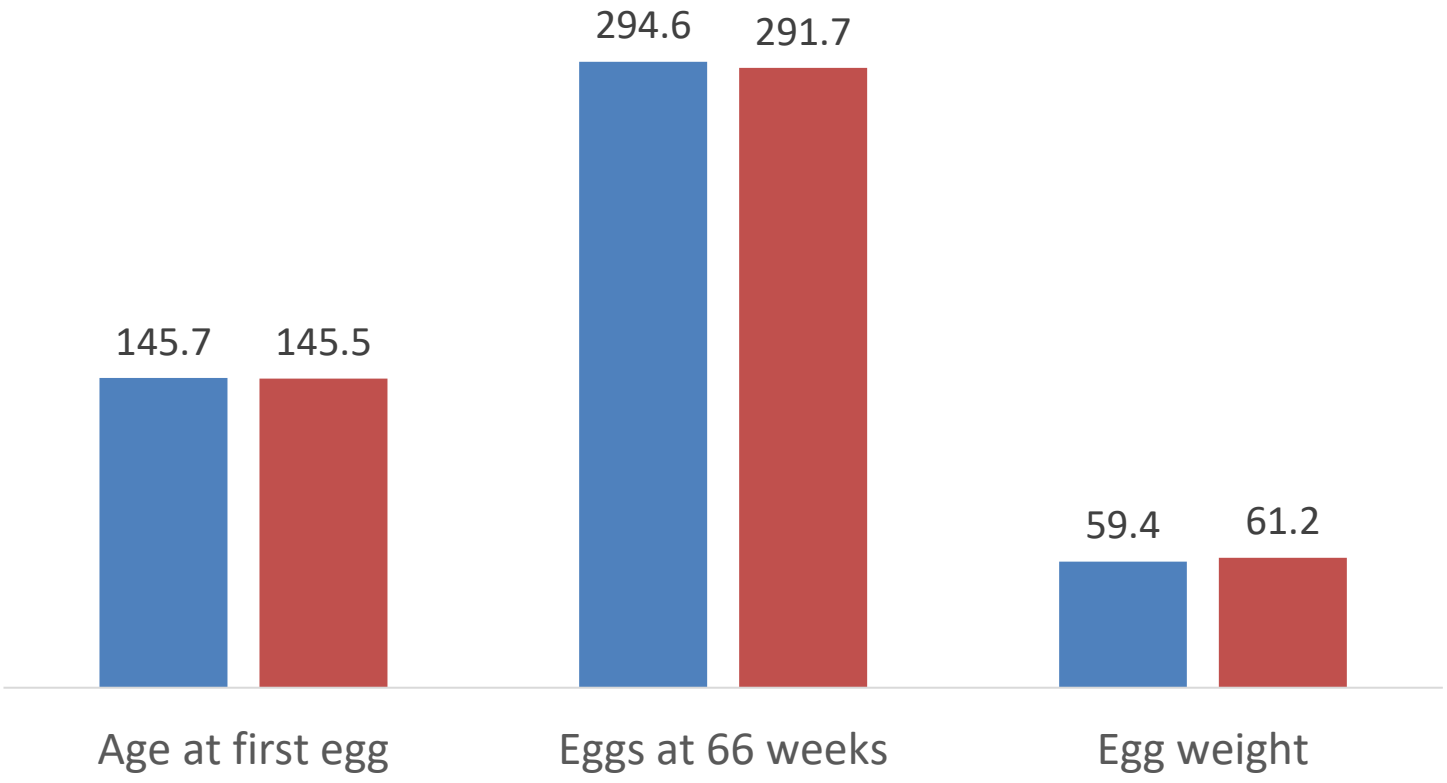
- Rapid growth period very critical (first 8 weeks).
- Important body weight/age:

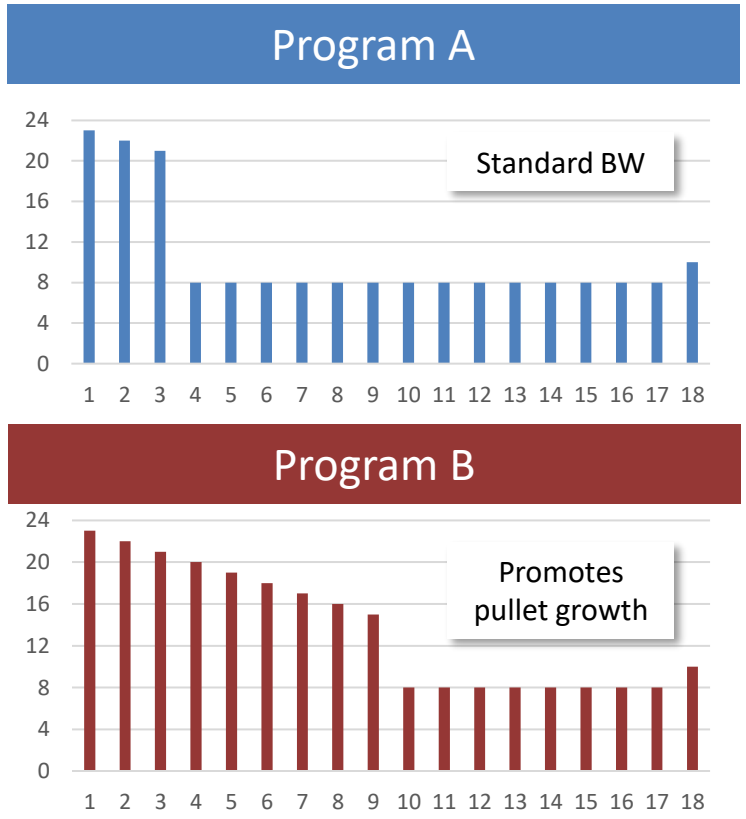
1. 5 weeks
2. 8 weeks
3. 12 weeks
4. Body weight at light stimulation

Minimize the management impacting BW in the first weeks of life

1. Optimal nutrition.
2. Follow feeder space, drinker space and stocking density recommendations.
3. Infrared beak treatment
4. Apply as many vaccines as possible in the hatchery
5. Less reactive vaccines.
6. Reduce the handling of birds as much as possible.
7. Lighting program in rearing.

Lighting program: White hens receiving different step-down





Source: Leeson 2005

Factors from rearing impacting egg size

- Body weight and uniformity.
- Body development.
- Nutrition.
- Uniformity.
- Lighting program.

Conclusion

- There is a direct relationship between the pullet's development during rearing and subsequent performance during the laying cycle, particularly egg weight and feed intake
- Adjusting feeding and management programs to the important stages of multiphasic growth must be the clear focus of todays nutritionists, veterinarians and poultry professionals.
- Flock uniformity (> 85%) is a major goal for achieving maximum performance for egg producers.
- Poor body weight and/or flock uniformities developed as early as **5 weeks of age** can have a marked influence on egg weight.

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