



Chick Length And Organ Development

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A study of the Research department of HatchTech showed a positive relation between chick length at day of hatch and chick weight at day 7. This suggests that a longer chick at day of hatch has a higher development and growth potential than a shorter chick. Furthermore, a longer compared to a shorter chick at hatch may have an improved organ development in later life. To investigate this hypothesis, a study was conducted by the research department of HatchTech.

Chicks of a breeder flock of 33 weeks old were selected. At day of hatch, chick length and chick weight was measured of 60 birds and they were then divided in 3 chick length groups. The large chick length group contained chicks with a length between 20.0-20.6 cm, the middle chick length group between 19.2-19.8 cm, and the small chick length group between 18.2-18.8 cm. All chicks were housed at a broiler farm of 9,000 birds and were fed a starter diet. At day 7 of age, body weight and organ weights were measured.

Results showed that there was a positive relation between chick length at day of hatch and chick weight at day 7 ($R=0.68$; $P<0.001$). Every extra cm of chick length at day of hatch resulted on average in 17.8 gram extra chick weight at day 7 of age. There was hardly any residual yolk found after 7 days, the weights ranged between 0.03 and 0.32 g. Forty-two percent of the chickens in the large chick length group, 59% of the middle chick length group and 20% of the small chick length group had some residual yolk in the body cavity at day 7 of age.

Chicks with the largest chick length at day of hatch had the heaviest heart, liver and spleen. The bursa of Fabricius and the intestine length showed no difference between the chick length groups (Table 1). The difference in heart and liver weight was not significant different between the large and middle chick length group, probably due to the small difference between the group in chick length.

The heart is an important organ for blood supply with oxygen and nutrients for the main organs. The heart can contribute to an optimal development and growth of the chicks, which helps to express the genetic potential of the bird. The liver and spleen are important organs as well for the development and growth of the chick. The liver is the largest glandular organ of the bird and has different important functions to maintain the homeostasis in the body. The spleen is a lymph organ and part of the blood filtering system and contributes to the immune system.

The length of the intestines and the bursa of Fabricius was not related to chick length in this study. The length of the intestine showed a lot of variation and was difficult to measure precisely and this might be the cause that no difference was found.

It can be concluded that chick length is positive related to the chick weight and the development of important organs such as the heart, liver and spleen. Chick length is, therefore, an important chick quality and performance tool for hatcheries and broiler farmers.

Table 1. Average chick length at day of hatch and organ weights at day 7 per chick length group

Chick length group	Chick length Day 0 (cm)	Heart (g)	Liver (g)	Spleen (g)	Bursa (g)	Intestine (cm)
Large chick length group	20.2 ^a	1.49 ^a	7.78 ^a	0.149 ^a	0.30	92.56
Middle chick length group	19.6 ^b	1.43 ^a	7.71 ^a	0.122 ^b	0.28	92.31
Small chick length group	18.6 ^c	1.25 ^b	6.51 ^b	0.120 ^c	0.26	83.85
Significant difference ($P < 0.05$)	yes	yes	yes	yes	no	no

^{a,b}Means in columns followed by different superscript are significant different ($P < 0.05$).

Additional information

The bursa of Fabricius is a round sac and is located just above the cloaca in birds. Mammals generally have no bursa. The chicks' bursa reaches its largest size a few weeks after hatching and then gradually decreases. B-cells, which are part of the immune system, develop, mature and migrate from the bursa to other parts of the body.

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