

## EFFECT OF EARLY FEED RESTRICTION ON GROWTH IN BROILER CHICKENS

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### **Abstract**

*We studied the effect of quantitative feed restriction in broiler chickens. There were 3 groups of day-old male and female broiler chickens. The first group (control group) was fed ad libitum, the second group was restricted from 7 to 14 days of age (8g/day/chick) and the third group from 7 to 11 days of age (6g/day/chick). After this period of restriction the chicken were fed ad libitum. Compensatory growth was observed in broiler chickens (cockerels and pullets). When we finished the trial full-fed cockerels weighed 2421 g, and restricted ones 2485 g and 2521 g. There was a small difference ( $P>0.05$ ) between restricted pullets (2390 g and 2312 g) and those fed ad libitum (2234 g).*

**Keywords:** growth, feed conversion, broiler, Ross 308

### **INTRODUCTION**

In order to produce animals with maximum lean body mass, highest feed conversion ratio and maximum body weight there can be used a feeding strategy in growing broiler chicken.

A high-speed growth rate in modern strains is the consequence of the improved nutrition and continuous genetic selection. The rate of fast growing in early-life goes along with a number of problems such as increased body fat deposition, high frequency of metabolic disorders, high mortality, and high incidence of skeletal diseases.

Early nutrient restriction programs were used to deal with these problems. Limiting feed intake interferes with growing during the period of restriction, but reduced growth can be later readjusted through realimentation. Nutrition efficiency can be improved during the compensatory growth period; also reducing body fat is possible. Some reports say that restricted chickens didn't show less abdominal fat.

Factors like age, intensity of restriction, sex and strain can influence fatness, feed efficiency and results of restricted feeding on growth. Osborne and Mendel observed for the first time (1915) the phenomenon of increasing growth after a period of feed restriction. A compensatory growth is faster than normal following a period of restriction. Male broilers have a superior capacity to exhibit compensatory growth following a period of restricted nutrition than females.

In our study we used quantitative restriction of nutrition in male and female broiler. The trial shows the effects of restricted nutrition in early-life on performance and growth. The research took place in the period between 2008 and 2009.

## MATERIAL AND METHODS

The chickens (day-old broiler) were divided into 24 separate floor cages, with 20 birds each. The trial had 3 groups with 20 cockerels or pullets each, 4 replications included. They were kept in wood shavings litter with a density of 16 birds / m<sup>2</sup>. The room had the temperature of 29°C gradually reduced to 20°C by 21 days of age. The light was continually on. There was a 4 cm space for feeding and 2 cm space for watering. The water was *ad libitum*. At the age of 42 days the trial was finished. The chickens' diet was split into 3 parts: one diet from 1 to 21 days, second diet from 22 to 35 days, the other from 35 to 42 days of age.

In Table 1. can be seen the composition of the nutrition mixtures. *Ad libitum* were fed the birds from the control group (group 1); group 2 was restricted from days of age 7 to 14 (10 g /day/chick), and group 3 from days of age 7 to 11 (8 g / day /chick). After the period of restriction, the chickens were fed *ad libitum*. From week to week we measured the weight of each chick. In the same time we recorded feed intake on a group basis too. Mortality was recorded in groups over the entire period of fattening.

Tabell

Feed formulation and analyses %

Ingredient	1-21 days	22-35 days	35-42 days
Maize	57.55	53.77	57.99
Soybean meal	31.30	33.30	30.20
Oil	2.70	5.20	6.70
Fish meal	5	3	-
Monocalcium Phosphate	1.40	1.60	1.70
Chalk	1.20	1.30	1.40
Salt	0.25	0.25	0.25
Zoofort	1	1	1
DL-Methionine	0.38	0.39	0.43
L-Lisine	0.22	0.19	0.28
Chemical Composition(%)			
Metabolisable Energy	3082	3172	3283
Crude Protein	23.44	22.97	20.16
Crude Fats	5.83	7.77	9.09
Crude Fibre	3.28	3.42	3.28
Ca	0.96	0.92	0.87
P	0.45	0.46	0.44

## RESULTS AND DISCUSSION

For the period of restriction, daily mass grow in cockerels was reduced about 50–70%. Feed restriction resulted in accelerated growth and at the age of 21 days, daily weight gain was similar in restricted and full-fed cockerels.

In the second half of the growth period, from the age 32 days, daily weight gain of restricted chickens was higher about 15% than in full-fed. Compensatory growth is a consequence of the minimization of the difference in body weight between restricted and control birds at 42 days of age (Table 2).

The present study proves that the period of restriction did not affect market body weight. In group 3, shorter restriction, growth compensation was higher than in group 2. These results sustain that in the mildest schedule, body weights achieved vaguely higher values than those of the chickens fed *ad libitum*.

The recovery of the full body weight can be fulfilled better if we use a number of short restricted periods than long ones.

Growth of pullets was like to the growth of cockerels throughout restriction and realimentation periods. From the age of 21 days daily weight gain of restricted pullets was higher by 10% than in full-fed ones. Restricted pullets were slightly ( $P < 0.05$ ) heavier than full-fed ones, at the age 42 of days (Table 2).

Table 2

Fattening characteristics in chickens (mean  $\pm$  SD)

Measurement	Treatment/sex					
	<i>ad libitum</i>		restriction 7–14th day of age		restriction 7–11th day of age	
	cockerels	pullets	cockerels	pullets	cockerels	pullets
Live weight 1st day of age (g)	38.62 $\pm$ 0.33	38.14 $\pm$ 0.38	38.56 $\pm$ 0.39	38.50 $\pm$ 0.40	38.68 $\pm$ 0.36	38.42 $\pm$ 0.35
Live weight 42th day of age (g)	2421 $\pm$ 34.49	2234 $\pm$ 32.41	2485 $\pm$ 39.97	2312 $\pm$ 24.26	2521 $\pm$ 32.11	2390 $\pm$ 36.63
Weight gain 1–42th day of age (g)	56.72 $\pm$ 1.87	52.28 $\pm$ 1.23	58.24 $\pm$ 1.11	54.13 $\pm$ 1.63	59.10 $\pm$ 2.02	55.99 $\pm$ 1.80
Feed intake (per day/chicken)(g)	109.51 $\pm$ 3.38	111.16 $\pm$ 3.70	104.13 $\pm$ 1.79	107.34 $\pm$ 0.96	100.84 $\pm$ 2.25	104.70 $\pm$ 1.44
Feed conversion (kg)	1.90 $\pm$ 0.09	2.09 $\pm$ 0.08	1.76 $\pm$ 0.11	1.95 $\pm$ 0.10	1.68 $\pm$ 0.08	1.84 $\pm$ 0.09
Mortality	4	3	2	1	1	2

At the age of 42 days the weight was similar in both restricted groups. The responses of pullets to early-life feed restriction were less obvious than those in cockerels. Cockerels have superior capacity than pullets to reveal compensatory growth after the period of restricted nutrition. Restricted cockerels and pullets compensated weight gain throughout the

first week after the restriction and at the age of 21 days the weight gains of restricted and unrestricted chickens were equal. In the period from 22 to 32 days of age restricted and full-fed cockerels grew similarly, but restricted pullets had higher weight gain than those fed *ad libitum*.

From 32 days of age restricted chickens of both sexes grew quicker than full-fed chickens. For both sexes, feed consuming by restricted birds was better than by full-fed ones. There were no major differences among the groups.

Limiting feed in the early life is useful because it allows us globally a lower price, thus the feed is the most expensive in broiler production. Restricted feed procedure can decrease mortality. In this trial, mortality was reduced in restricted groups of cockerels and pullets. Feed restriction slows down fast growth to reduce late mortality, including preascites and ascites. Restricted diet shrinks mortality caused by “sudden death syndrome”.

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