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THE IMPACT OF A LIGHTING PROGRAM WITH ASYMMETRIC TIME INTERVALS AND THE DENSITY PER UNIT AREA DURING FINISHING AND RESULTS IN SLAUGHTERING YOUTH MALE QUAIL OF BALOTEȘTI POPULATION

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Abstract

In order to study the impact of a lighting program with asymmetric time intervals and different densities during the finishing period of youth quail for meat and slaughter results of youth male quail from population of Balotești in the period 28 – 49 days of growth was organized an experiment on a total of 300 male. At the age of 28 days were divided into cages for youth quail in two batches: the first batch consisting of 150 males has undergone a program of continuous photoperiod lighting with 16 hours per day (lots B and D), and the second batch has undergone a program of lighting with asymmetric time intervals with duration of 16 hours per day (10 hours light + 2 hours dark + 6 hours light + 6 hours dark) (lots A and C). Also, in the two batches was tested the effect of an experimental density of 250 cmp /head comparative with a control density of 125 cmp/head (lots B and D). From researches it is established that the best performances were recorded at the males from the batch A, who were subjected to a lighting program of 16 hours with asymmetric time intervals and was applied the experimental density of 250 cmp/head. The average live weight at the age of 49 days was with 6.47 % higher at batch B comparative with the batch A, with 9.21 % at batch C and with 13.71 % at batch D. Also in the batch A was registered the largest average carcass weight at age of 49 days (with 6.25 % from the batch B, with 11.02 % from the batch C, with 15.85 % from the batch D).
Considering that have been registered superior performance at batch A is advisable when quail males are raised in the direction of meat production to be used a lighting program of 16 hours with asymmetric time intervals and a lower density of males in the cage because it significantly influence growth and slaughter performance.

Key words : *quail, growth, light, density, carcass.*

INTRODUCTION

In general, many breeders use continuous light in raising youth quail, but it was found that the continuous light may exert a negative effect on growth.
For example, at chickens raised with continuous light has determined a severe physiological stress (Campo and Davila, 2002; Kliger et al., 2005).
In general, the lighting programs asymmetrical fractionated presents an interesting potential for birds whereas help applying food restrictions and allow saving of electricity (Popescu-Micloșanu., 2007).
Density per unit area commonly practiced during the growth of youth of quail is 100 – 150 cmp/head (Velcea M., 2001).

MATERIALS AND METHODS

Research was conducted on a number of 300 males quail from Balotesti population in the period 42 – 49 days of finishing. From the age of 28 days, males have been divided into four batches according to the following experimental scheme (table 1).
The lighting program with asymmetric time intervals with duration of 16 hours a day had the following structure: 10 hours light + 2 hours dark + 6 hours light + 6 hours dark. The lighting program with continuous photoperiod refers to the cycle of 16 hours light with 8 hours darkness.
The environmental conditions were falling within the limits laid down by the specialty literature.

Table 1. Experimental scheme of the research

Specification	Density	
	250 cmp/head	125 cmp/head
Lighting program with asymmetric time intervals	Batch A	Batch B
Lighting program with continuous photoperiod	Batch C	Batch D

The research was carried out in the framework of the quail holding of Ionita T. Lucian individual enterprise located in the village of Gherghita, Prahova County, Romania.
The data have been processed using Microsoft Excell 2010, and the significance of the differences between the averages has been tested using Student test.

RESULTS AND DISCUSSIONS

Evolution of the average growth performance at males from the 4 batches in the period 42 – 49 days

The average live weight at 42 days the highest was recorded at males from the batch A (181.40 ± 2.26), with 4.37 % higher as the males from the batch B, with 10.29 % higher as the males from the batch C and with 11.72 % higher as the males from the batch D. The same situation occurred at the age of 49 days, differences in favour for batch A being something higher. Average gain growth was higher by almost 50 % in the case of batches which has been applied to the density of 250 cmp/head (A and C). The average consumption of compounds feed in the period of 42 – 49 days was higher in the case of batch A (185.00 ± 3.18 g) comparative with batches B, C and D. Specific consumption was almost 50 % lower at batches A and C comparative with batches B and D.

Slaughter results obtained at the males from the 4 batches during finishing period at 42 days and 49 days

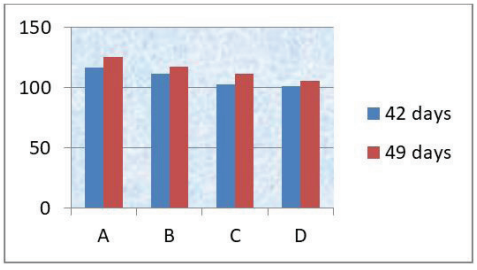

Figure 1. The average weight of the carcase at the 4 batches analysed at ages 42 and 49 days

In general, slaughter results at the age of 42 days (average carcass weight of 116.60 ± 1.80 g and 64.77 % ± 0.56 slaughtering efficiency), and at the age of 49 days (average carcass weight of 125.73 ± 1.73 g and 65.46 % ± 0.66 slaughtering efficiency) were higher in the case of batch A.
If slaughtering efficiency has not experienced any significant differences between the 4 batches, in terms of the average carcass weight were very significant differences at the age of 42 days, and at the age of 49 days (lowest average weight was recorded at the batch D, respectively 101.53 ± 0.78 g at the age of 42 days and 105.80 ± 1.52 g at the age of 49 days).
So at the age of 42 days, and of 49 days were very significant differences in favour of the batch A and the batch B comparative with batches C and D.
The average proportion of blood recorded insignificant variations at all 4 batches and at both ages analysed (at the age of 49 days between 1.85% ± 0.12 at batch B and 2.61 % to batch C and D.
Average proportion of flocs the lowest was recorded in the case of batch C at the age of 49 days (11.84 % ± 0.33), while the highest was recorded in the case of batch B at the age of 42 days (13.02 % ± 0.97), differences between the 4 batches being so insignificant to 42 days and 49 days.
The average proportion of organs and intestines recorded variations between 18.27 % ± 0.34 in the case of batch A at the age of 49 days and 20.82 % ± 0.26 in the case of batch C at the age of 42 days, the differences between the 4 batches being insignificant in both ages analysed.
The average weight of the chest was higher in the case of batch A at the 49 days of age (60.27 g ± 0.81, when was recorded the highest average carcass weight) comparative to the average weight of the chest to the other batches at the two analysed age.

Table 2. Average growth performance over the period 42 – 49 days and the average slaughter results at 42 days and at 49 days at quails from the 4 analysed batches

Specification	Batch A		Batch B		Batch C		Batch D	
	42 days	49 days	42 days	49 days	42 days	49 days	42 days	49 days
Live weight (g)	181.40 ± 2.26	192.60 ± 3.83 aaa	173.47 ± 2.00	180.13 ± 2.19 aaa	162.73 ± 1.18	174.87 ± 2.57 bbb	160.13 ± 1.14	166.20 ± 1.93 bbb
Average gain - 42 – 49 days (g)	11.20 ± 0.85		6.67± 0.35		12.94 ± 0.68		6.07 ± 0.23	
Average consumption of compounds feed (g/head)	185.00 ± 3.18		175.15 ± 3.44		173. 65 ± 3.75		169.25 ± 2.88	
Specific consumption (g c.f./g gain)	16.52 ± 0.96		26.25 ± 1.85		13.42 ± 1.15		27.83 ± 1..55	
Weight of the carcase after bleeding (g)	177.40 ± 2.24	188.40 ± 3.47 aaa	169.00 ± 2.07	176.80 ± 2.14 aaa	158.47 ± 1.20	170.33 ± 2.70 bbb	156.33 ± 1.11	161.87 ± 1.96 bbb
Weight of the carcase after plucking (g)	155.33 ± 2.10	162.33 ± 3.41 aaa	147.00 ± 2.51	158.73 ± 2.18 aaa	139.79 ± 1.42	149.45 ± 2.84 bbb	137.07 ± 1.33	142.20 ± 1.77 bbb
Weight of the carcase after evisceration (g)	116.60 ± 1.80	125.73 ± 1.73 aaa	111.60 ± 1.74	117.87 ± 3.07 aaa	103.13 ± 0.78	111.87 ± 1.89 bbb	101.53 ± 0.78	105.80 ± 1.42 bbb
Cutting efficiency (eviscerated shell/live weight) (%)	64.77 ± 0.56	65.46 ± 0.66 ns	64.51 ± 0.52	65.42 ± 0.59 ns	63.27 ± 0.27	63.96 ± 0.41 ns	63.41 ± 0.33	63.66 ± 0.46 ns
Weight of the blood (g)	4.00 ± 0.29	4.20 ± 0.29 ns	4.47 ± 0.26	3.33 ± 0.23 ns	4.27 ± 0.21	4.53 ± 0.34 ns	3.80 ± 0.24	4.33 ± 0.25 ns
Weight of the flocs (g)	22.07 ± 1.14	21.07 ± 0.40 ns	22.00 ± 1.62	18.07 ± 0.54 ns	18.73 ± 0.46	20.87 ± 0.68 ns	19.27 ± 0.56	19.67 ± 0.57 ns
Weight of the organs and the intestines (g)	29.80 ± 0.52	30.47 ± 0.45 ns	29.00 ± 0.37	30.07 ± 0.36 ns	29.07 ± 0.34	29.13 ± 0.79 ns	27.80 ± 0.52	28.33 ± 0.66 ns
Proportion of the blood (%)	2.21 ± 0.17	2.18 ± 0.15 ns	2.58 ± 0.16	1.85 ± 0.12 ns	2.61 ± 0.13	2.61 ± 0.21 ns	2.37 ± 0.14	2.61 ± 0.15 ns
Proportion of flocs (%)	12.42 ± 0.59	11.19 ± 0.10 ns	13.02 ± 0.97	12.22 ± 0.28 ns	11.84 ± 0.33	12.30 ± 0.45 ns	12.33 ± 0.38	12.15 ± 0.31 ns
Proportion of the organs and the intestines (%)	19.21 ± 0.31	18.27 ± 0.34 ns	19.80 ± 0.38	18.96 ± 0.23 ns	20.82 ± 0.26	19.64 ± 0.48 ns	20.29 ± 0.38	19.94 ± 0.45 ns

Table 3. The weight and proportion of the component parts of the carcase to the males from the 4 batches during finishing period at 42 days and 49 days

Specification	**Batch A**		**Batch B**		**Batch C**		**Batch D**	
	42 days	49 days	42 days	49 days	42 days	49 days	42 days	49 days
Weight of the carcase (g)	116.60 ± 1.80	125.73 ± 1.73 aaa	111.60 ± 1.74	117.87 ± 1.07 aaa	103.13 ± 0.76	111.87 ± 1.89 bbb	101.53 ± 0.78	105.80 ± 1.42 bbb
Weight of the chest (g)	53.87 ± 0.79	60.27 ± 0.81 aaa	50.40 ± 0.94	53.13 ± 0.13 aaa	48.67 ± 0.56	51.80 ± 1.05 bbb	46.93 ± 0.63	49.40 ± 0.96 bbb
Weight of the thighs (g)	28.20 ± 0.48	28.73 ± 0.69 ns	27.67 ± 0.62	27.20 ± 0.66 ns	26.93 ± 0.66	26.80 ± 0.52 ns	26.47 ± 0.48	27.07 ± 0.55 ns
Weight of the cord (g)	23.60 ± 0.64	23.92 ± 0.63 ns	23.06 ± 0.46	23.87 ± 0.82 ns	21.67 ± 0.51	22.00 ± 0.36 ns	23.13 ± 0.69	22.47 ± 0.47 ns
Weight of the wings (g)	8.43 ± 0.26	9.27 ± 0.25 ns	8.07 ± 0.12	8.20 ± 0.30 ns	7.67 ± 0.23	8.40 ± 0.19 ns	8.00 ± 0.24	7.8 ± 0.17 ns
Proportion of the chest (%)	46.24 ± 0.43	47.95 ± 0.67 ns	45.18 ± 0.55	45.13 ± 0.65 ns	45.19 ± 0.44	46.33 ± 0.61 ns	46.21 ± 0.39	46.73 ± 0.85 ns
Proportion of the thighs (%)	24.20 ± 0.26	22.92 ± 0.64 ns	24.89 ± 0.72	23.06 ± 0.36 ns	26.11 ± 0.42	24.00 ± 0.43 ns	26.05 ± 0.39	25.65 ± 0.62 ns
Proportion of the cord (%)	20.26 ± 0.49	19.11 ± 0.61 ns	20.70 ± 0.71	20.31 ± 0.78 ns	21.02 ± 0.29	19.70 ± 0.32 ns	22.79 ± 0.37	21.29 ± 0.52 ns
Proportion of the wings (%)	7.24 ± 0.20	7.41 ± 0.28 ns	7.24 ± 0.10	6.94 ± 0.19 ns	7.44 ± 0.23	7.52 ± 0.14 ns	7.88 ± 0.24	7.34 ± 0.21 ns

The average proportion of the chest in total carcass was the highest in the case of the batch A at the 49 days of age (47.95 % ± 0.67), and the lowest was recorded in the case of the batch B at the age of 49 days (45.13 % ± 0.65), differences between the 4 batches at the age of 42 days, and at the age of 49 days being insignificant.

The average weight of the thighs was higher in the case of the batch A at the 49 days of age

(28.73 g ± 0.69) comparative to the average weight of the thighs to the other batches on the two analysed age. The average proportion of the thighs in total carcass was the highest in the case of the batch C at the age of 42 days (26.11 % ± 0.42), and the lowest was recorded in the case of the batch A at the 49 days of age (22.92 % ± 0.64), differences between the 4 batches at the age of 42 days, and at the age of 49 days being insignificant.

The average weight of the cord was higher in the case of the batch A at the 49 days of age (23.92 g ± 0.63) comparative to the average weight of the cord to other batches on the two analysed age. The average proportion of the cord in total carcass was the most reduced in the case of the batch A at the 49 days of age (19.11 % ± 0.61), while the highest was recorded in the case of the batch D at the age of 42 days (22.79 % ± 0.37), differences between the 4 batches at the age of 42 days, and at the age of 49 days being insignificant.

The average weight of the wings was higher in the case of the batch A at the 49 days of age (9.27 g ± 0.25 g) comparative to the average weight of the wings to other batches on the two analysed age. The average proportion of the wings in total carcass was the highest in the case of the batch D at the age of 42 days (7.88 % ± 0.24), and the lowest was recorded in the case of the batch B at the age of 49 days (6.94 % ± 0.19), the differences between the 4 batches at the age of 42 days, and at the age of 49 days being insignificant.

In a study carried out in Romania (Elena Popescu-Micloşanu et al., 2008), about slaughter results of males quail at the age of 42 days, maintained at 24 hours light per day, were set the following parameters of carcass quail: 70.86 % carcass efficiency (with skin), the chest of 41.04 % and thighs of 24.3 % from live weight.

In a study conducted in Nigeria on a number of Japanese quail males with age of 10 weeks has been set an carcass efficiency of 67.82%, a proportion of the chest of 34.41% and a proportion of the thighs of 24.02%, which, as a percentage, are similar to those recorded in the "Balotesti" population in this study.

In a study conducted in Iran (Vali et al., 2005) on a number of youth quails aged of 49 days is mentioned an average weight of the carcass of 121.70 g, a carcass yield of 66.24%, an average chest weight of 49.64 g, corresponding to a proportion of 40.84% and a weight of thighs of 27.67 g, corresponding to a proportion of 23.03%.

In a study conducted in Bulgaria (Genchev et al., 2004) on an number of youth quails with age of 35 days has been established a carcass efficiency of 64.5%, a proportion of the chest of 25.38% and a proportion of the thighs of 16.3%, characteristics that are lower than those determined at quails from the population of this experiment at the age of 6 weeks.

CONCLUSIONS

Live weight at 49 days was higher with 5.82% at batch A comparative with batch B (to which it was applied to a lighting program with asymmetric time intervals lasting 16 hours and a density of 250 cmp/head) and with 4.96% (batches at which has been applied a continuous lighting program with duration of 16 hours and a density of 125 cmp), differences being very significant. Also, in the same direction were recorded differences as regards the gain growth, consumption of compound feed and specific consumption.

Eviscerated carcass weight was with 7.86% higher to the batch A comparative to the batch B and with 6.07% at batch C comparative to the batch D. The weight of the chest was with 11.85% higher to the batch A comparative to the batch B and with 4.63% at batch C comparative to the batch D.

Considering the higher performance recorded at batches A and C is advisable that when quail males are raised in the direction of meat production to be used a lighting program of 16 hours with asymmetric time intervals and a lower density of males in the cage, because they significantly influence the growth and slaughter performance of males.

In order to establish the light impact on the growth at youth quails should be still conducting detailed research.

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