

STUDY ON THE SLAUGHTER RESULTS ACCORDING TO SEX AND AGE OF SLAUGHTER IN QUAILS FROM BROWN JUMBO MEAT POPULATION

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Abstract

The research was carried out on a number of 300 meat quails from the brown Jumbo population; sacrifices were made at the age of 42 days, 49 and 56 days separately by sex. Following the research, the average live weight at 42 days was of 290.60 ± 8.38 g / bird head in females and 245.00 ± 7.90 g / head in males, at 49 days it was 326.00 ± 11.41 g / bird in females and 256.80 ± 6.14 g / bird in males, while at 56 days this was 332.80 ± 8.51 g / bird in females and 269.60 ± 4.18 g / head in males, the differences between sexes being very significant. The yield of the eviscerated carcass at 42 days was 70.45 ± 1.46 % in females and 70.98 ± 1.89 % in males, at 49 days it was 67.19 ± 1.02 % in females and 71.14 ± 0.87 % in males, and in 56 days this was 71.56 ± 0.68 % in females and 70.05 ± 0.25 % in males. From the point of view of the evolution of the average daily weight gain during the period 1-56 days, as well as the weight of the carcass and its component parts, conclusions can be drawn regarding the optimal age of slaughter of Jumbo quails. This is of 42 days in case of slaughtering both sexes, 42 or 49 days in case of females slaughtering and 42 days of males.

Key words: quail, meat, slaughter, yield, age

INTRODUCTION

The rearing of quails in Romania has undergone a continuous development lately, starting from rearing as an activity related to other basic activities or as a hobby 30 years ago, to a specialized rearing with hundreds of thousands of eggs and thousands tons of meat annually and with investments of even millions of euros through European funds in equipment and slaughterhouses. In these conditions, however, the need arises for careful study of reproductive material and environmental factors before their farming in an organized and commercial way [9]. Thus, they have been brought to different breeding meat quails from other populations, without having been tested before and without designing a basic breeding technology for these birds, they being generally reared as mixed Japanese quails (used breeding

density, mixed feed recipes, slaughter age etc. being the same as in mixed quails). The characteristics of the carcass and the chemical composition of the quail meat are influenced by many factors, including the genotype of birds [6], the feeding mode [2], [4] and the age of slaughter [3]. The purpose of this paper was to establish the results for slaughter separately for the two sexes, but also an optimal age for slaughtering quails from the brown Jumbo meat population.

MATERIAL AND METHOD

The research was carried out on a number of 300 quails from the Jumbo meat population (fig.1), sacrificing 50 males and 50 females at the age of 42 days, 49 days and 56 days. The researches took place within the quail farm Ioniță T. Lucian Individual Enterprise in Gherghița Commune, Jud. Prahova, Romania. The environmental conditions in which the researches were carried out were within the limits provided by the specialized literature [5, 11]. During

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the experiment, two compound feed recipes were fed namely quail starter (1 - 3 weeks) and quail grower (4 - 8 weeks). The quail starter compound feed (c.f.) recipe had the following nutritional value: 3010 Kcal metabolizable energy / kg c.f., 24.80 % crude protein, 5.10 % crude fat, 0.59 % methionine, 0.97 % methionine+cystine, 1.58 % lysine, 0.96 % calcium and 0.78 % phosphorus,

0.03% choline, 0.40 % salt. The compound feed specific for the second phase of youth quail growth had the following calculated nutritional values: 3140 Kcal metabolizable energy / kg c.f., 22.50 % crude protein, 6.10% crude fat, 0.64 % methionine, 0.98 % methionine+cystine, 1.33 % lysine, 0.96 % calcium and 0.75 % phosphorus, 0.03 % choline, 0.40 % salt. [13].



Fig. 1 Female (left) and male (right) quail in brown Jumbo meat population

The live weight was determined for each bird separately, and then the carcasses were marked, determining the weight of the bleeding carcass, the plucked carcass and the eviscerated carcass. Then the average data for both the male and female carcasses were calculated. The same has been done for the component parts of the carcass (breast, legs, wings, back). Finally, the proportions were established for the different components of the carcass. As for establishing the meanings of differences between the averages, it is a Student test [10], and data processing was done using Microsoft Excel 2007.

RESULTS AND DISCUSSIONS

The results are presented in the tables 1, 2, 3, 4 and fig. 2.

Dynamics of live weight in Jumbo Quail meat population, throughout age span 1 -56 days. If at the age of 1 day the weight of the chickens was 9.47 ± 0.07 g / head (Table 1) (both genders), since the sexing was not performed at the age of 1 day, at the age of 42 days the weight of the chickens was 290.60 ± 8.38 g in females, very significantly higher ($t=3.960$) with 15.70 %, compared to the one of males (245.00 ± 7.90 g / head) (Table 1).

Table 1 Average live weight at 1 day and 42, 49 and 56 days in female and male quails (g)

Age	Females	Males
1 day	9.47 ± 0.07	
42 days	$290.60 \pm 8.38^{***}$	$245.00 \pm 7.90^{***}$
49 days	$326.00 \pm 11.84^{***}$	$256.80 \pm 6.14^{***}$
56 days	$332.80 \pm 8.51^{***}$	$269.20 \pm 4.18^{***}$
Statistical significance Student values	t calculated < 1.982 – insignificant differences- ns t calculated = 1.982 - 2.871 – significant differences * ($t_{0.05} = 1,982$) t calculated = 2.871 – 3.390 – distinct significant differences ** ($t_{0.010} = 2.871$) t calculated > t 0.001 = 3.390 – very significant differences *** ($t_{0.001} = 3.390$)	

Note. Between the values noted *** the differences are very significant at the same age

At 49 days of age, the weight in females (326.00 ± 11.84 g / head) was 21.23 % very

significantly higher ($t=5.313$) (compared to that of males (256.80 ± 6.14 g / head). At 56

days the weight in females (332.80 ± 8.51 g / head) it was 19.11 % very significantly higher ($t=6.701$) compared to the weight of males (269.20 ± 4.18 g / head).

Dynamics of average daily weight gain in Jumbo quail meat population, throughout age span 1 – 56 days. Depending on the average daily weight gain, which

decreases after 6 weeks (Table 2), the optimal age of slaughter of Jumbo meat quail seems to be 42 days for both genders, 42 or 49 days for females (up to 7 weeks the weight gain decreases by only 3.44 % compared to 6 weeks) and 42 days for males (up to 7 weeks the weight gain decreases almost 3 times, with 9.98 %) (Table 2).

Table 2 Average daily weight gain from 1 day and up to 42, 49 and 56 days in female and male quails

Trait and age	Females		Males		Population mean	
	g	%	g	%	g	%
Average daily gain 1 - 42 days	6.69	100	5.61	100	6.15	100
Average daily gain 1 - 49 days	6.46	96.56	5.05	90.02	5.75	93.49
Average daily gain 1 - 56 days	5.77	86.25	4.64	82.71	5.20	84.55

Slaughter performances of Jumbo quail meat population at the age 42, 49 and 56 days. The weight of the eviscerated carcass (tab. 3, fig. 2) in the case of females (205.00 ± 8.82 g / head) was at 42 days old, 15.22% higher compared to that of males (173.80 ± 6.37 g / head), the differences being very significant ($t=3.423$). At 49 days of age, in females (219.20 ± 9.31 g / head) it was

16.70% higher than in males (182.60 ± 4.18 g / head) ($t=3.585$), while at 56 days the average weight of the eviscerated carcass it was 20.75% higher in females (238.00 ± 4.79 g / head) compared to that of males (188.60 ± 3.19 g / head), the differences between the sexes being very significant ($t=8.591$) at all ages of the experiment.

Table 3 Average slaughter results at 42, 49 and 56 days in Jumbo meat quails

Trait	Slaughter results 42 days		Slaughter results 49 days		Slaughter results 56 days	
	Female	Male	Female	Male	Female	Male
ALW (g)	$290.60 \pm 8.38^{***}$	$245.00 \pm 7.90^{***}$	$326.00 \pm 11.41^{***}$	$256.80 \pm 6.14^{***}$	$332.80 \pm 8.51^{***}$	$269.60 \pm 4.18^{***}$
CBW (g)	$279.80 \pm 8.14^{***}$	$235.80 \pm 8.41^{***}$	$309.00 \pm 11.00^{***}$	$249.00 \pm 6.02^{***}$	$318.60 \pm 7.86^{***}$	$260.20 \pm 3.77^{***}$
PCW (g)	$260.20 \pm 6.38^{***}$	$220.00 \pm 7.34^{***}$	$288.00 \pm 11.02^{***}$	$227.00 \pm 4.97^{***}$	$288.20 \pm 4.48^{***}$	$237.40 \pm 4.50^{***}$
ECW (g)	$205.00 \pm 8.82^{***}$	$173.80 \pm 6.37^{***}$	$219.20 \pm 9.31^{***}$	$182.60 \pm 4.18^{***}$	$238.00 \pm 4.79^{***}$	$188.60 \pm 3.19^{***}$
SY (%)	70.45 ± 1.46 ns	70.98 ± 1.89 ns	$67.19 \pm 1.02^{**}$	$71.14 \pm 0.87^{**}$	71.56 ± 0.68 ns	70.05 ± 0.25 ns
BW (g)	$10.80 \pm 0.58^{***}$	$9.20 \pm 0.80^{***}$	$17.00 \pm 1.81^{***}$	$7.80 \pm 0.20^{***}$	$14.20 \pm 1.07^{***}$	$9.00 \pm 0.45^{***}$
FW (g)	$30.40 \pm 3.38^{***}$	$25.00 \pm 5.76^{***}$	$38.00 \pm 1.97^{***}$	$29.80 \pm 1.39^{***}$	$44.60 \pm 4.14^{***}$	$31.80 \pm 1.66^{***}$
OIW (g)	$44.40 \pm 1.94^{***}$	$30.20 \pm 2.89^{***}$	$45.00 \pm 1.52^{***}$	$29.04 \pm 1.02^{***}$	$46.00 \pm 0.71^{***}$	$29.40 \pm 0.93^{***}$
BP (%)	3.72 ± 0.18	3.79 ± 0.41	5.21 ± 0.55	3.04 ± 0.07	4.26 ± 0.25	3.34 ± 0.12
FP (%)	10.40 ± 0.98	10.11 ± 2.35	11.69 ± 0.65	11.58 ± 0.31	13.31 ± 0.93	11.82 ± 0.63
OIP (%)	15.30 ± 0.63	12.24 ± 0.80	13.81 ± 0.24	11.44 ± 0.24	13.86 ± 0.39	10.93 ± 0.39
Statistical significance values	t calculated < 1.982 – insignificant differences - ns t calculated = 1.982 - 2.871 – significant differences * ($t_{0.05} = 1.982$) t calculated = 2.871 – 3.390 – distinct significant differences ** ($t_{0.010} = 2.871$) t calculated > 3.390 – very significant differences *** ($t_{0.001} = 3.390$)					

Note: ALW-average live weight; CBW- carcass after bleeding weight; PCW-plucked carcass weight; ECW - eviscerated carcass weight; SY – slaughter yield; BW - blood weight; FW – flakes weight; OIW – organs and intestines weight; BP – blood proportion; FP – flakes proportion, OIP - organs and intestines proportion

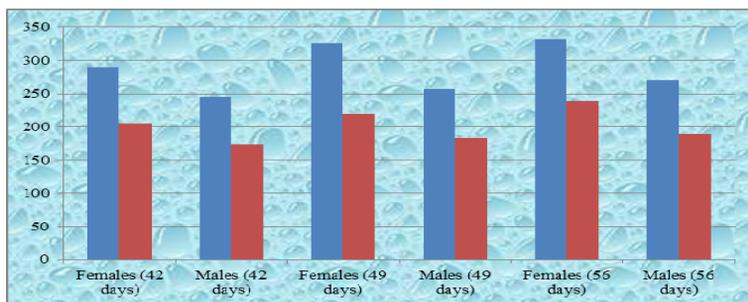


Fig. 2 The average live weight and the weight of the eviscerated carcass at the age of 42 days, 49 days and 56 days in the females and males from the Jumbo meat quail population

In a study conducted in Brazil [1] on a flock of meat quail *Coturnix* sp. from the Italian population, an average weight of the carcass was obtained in males similar to that in the present experiment in males (177.2 g / head at 42 days and 180.20 g at 49 days).

In a study carried out in Romania [8] on two batches of mixed and meat quail, in the group of meat quail, an average weight of 244.9 g / head (average weight for females and males) is mentioned at the age of 42 days.

In a study carried out in Turkey [12] on quails selected in the direction of meat production, a living weight of 42 days of 211.8 g / head is mentioned, a carcass weight of 146 g, a chest weight of 53 g and a weight of the wings of 33.7 g. At 49 days of age the average live weight was 220.5 g / head, the average weight of the carcass was 149.7 g / head, the average weight of the chest was 53.8 g, and the weight the average legs size was 34.3 g. At 56 days the average live weight was 225.6 g / head, the average carcass weight was 152.5 g / head, the average chest weight was 55.7 g, and the legs weight was 34.8 g.

A study in Egypt [7] showed that out of four different colored quail populations, the white ones had the highest body weight, with the best carcass characteristics and meat quality.

The yield of the eviscerated carcass from the present experiment (Table 3) at the age of 42 days was 70.45 ± 1.46 % in females and 70.98 ± 1.89 % in males, the difference being not significant ($t=0.220$). At the age of 49 days, it was 67.19 ± 1.02 % in females and

71.14 ± 0.87 % in males, the difference being distinctly significant ($t= 2.943$), while at the age of 56 days it reached 71.56 ± 0.68 % in females and 70.05 ± 0.25 % in males, the difference being not significant ($t=1.889$).

Cuts parts in the carcass in Jumbo quail meat population slaughtered at 42, 49, and 56 days old. The average breast weight (tab. 4) at 42 days was 116.80 ± 6.11 g in females and 82.40 ± 4.65 g in males, with 29.45% higher in females, the difference being very significant ($t=4.478$). The average breast proportion at the same age was 57.05 ± 2.20 % in females and $47.42\% \pm 2.00$ in males.

The average breast weight at 49 days was 117.00 ± 4.78 g in females and 93.00 ± 1.70 g in males, 20.51% higher in females, the difference being very significant (4.724). The average breast proportion was 53.49 ± 1.55 % in females and 50.98 ± 0.87 % in males.

The average breast weight at 56 days was 117.80 ± 2.21 g in females and 102.40 ± 1.50 g in males, 13.07 % higher in females, the difference being very significant ($t=5.828$). The average breast proportion was 53.82 % ± 1.65 in females and 54.31 % ± 0.44 in males.

The average legs weight (tab. 4) at 42 days was 49.40 ± 2.50 g in females and 41.00 ± 1.22 g in males, 17 % higher in females, the difference being distinctly significant ($t=3.015$). The average proportion of the legs was 24.12 ± 0.79 % in females and 23.64 ± 0.50 % in males. The average weight of the legs at the age of 49 days was 42.60 ± 1.29 g in females and 33.40 ± 1.69 g in males, with 21.60 % higher in females, the difference being distinctly significant ($t=2.895$). The average proportion of the legs was 23.00 ± 0.29 % in

females and 22.63 ± 0.88 % in males. The average weight of the legs at 56 days was 50.00 ± 1.00 g in females and 50.00 ± 0.71 g in males, the difference being insignificant between the two sexes. The average proportion of the legs was 21.05 ± 0.67 % in females and 26.52 ± 0.21 % in males.

The average back weight (tab.4) at 42 days was 41.40 ± 1.17 g in females and 29.20 ± 1.74 g in males, with 29.47 % higher in females, the difference being very significant ($t=5.816$). The average proportion of back was 20.26 ± 0.46 % in females and $16.78 \pm$

0.56 % in males. The average back weight at 49 days was 42.60 ± 1.29 g in females and 33.40 ± 1.69 g in males, 21.60 % higher in females, the difference being very significant ($t=4.327$). The average back proportion was 19.51 ± 0.60 % in females and 18.33 ± 1.05 % in males. The average back weight at 56 days was 37.40 ± 0.87 g in females and 30.20 ± 1.16 g in males, with 19.25 % higher in females, the difference being very significant ($t=4.968$). The average proportion of back was 15.73 ± 0.69 % in females and 16.04 ± 0.72 % in males.

Table 4 The weight and the share of the carcass cuts at 42, 49 and 56 days in females and males of Jumbo meat quail

Specification	Slaughter results at 42 days		Slaughter results at 49 days		Slaughter results at 56 days	
	Females	Males	Females	Males	Females	Males
ABW (g)	$116.80 \pm 6.11^{***}$	$82.40 \pm 4.65^{***}$	$117.00 \pm 4.78^{***}$	$93.00 \pm 1.70^{***}$	$117.80 \pm 2.21^{***}$	$102.40 \pm 1.50^{***}$
ALW (g)	$49.40 \pm 2.50^{**}$	$41.00 \pm 1.22^{**}$	$50.40 \pm 2.25^{**}$	$41.40 \pm 2.20^{**}$	50.00 ± 1.00^{ns}	50.00 ± 0.71^{ns}
ABW (g)	$41.40 \pm 1.17^{***}$	$29.20 \pm 1.74^{***}$	$42.60 \pm 1.29^{***}$	$33.40 \pm 1.69^{***}$	$37.40 \pm 0.87^{***}$	$30.20 \pm 1.16^{***}$
ABW (g)	12.60 ± 0.51^{ns}	11.60 ± 0.55^{ns}	11.80 ± 0.49^{ns}	11.40 ± 0.51^{ns}	12.40 ± 0.51^{ns}	11.80 ± 0.37^{ns}
ABP (%)	57.05 ± 2.20	47.42 ± 2.00	53.49 ± 1.55	50.98 ± 0.87	53.82 ± 1.65	54.31 ± 0.44
ALP (%)	24.12 ± 0.79	23.64 ± 0.50	23.00 ± 0.29	22.63 ± 0.88	21.05 ± 0.67	26.52 ± 0.21
ALP (%)	20.26 ± 0.46	16.78 ± 0.56	19.51 ± 0.60	18.33 ± 1.05	15.73 ± 0.69	16.04 ± 0.72
ABP (%)	6.19 ± 0.39	6.68 ± 0.19	5.51 ± 0.24	6.23 ± 0.20	6.68 ± 0.32	6.26 ± 0.18
Statistical significance Student values	t calculated < 1.982 – insignificant differences - ns t calculated = 1.982 - 2.871 – significant differences * ($t_{0.05} = 1.982$) t calculated = 2.871 – 3.390 – distinct significant differences ** ($t_{0.010} = 2.871$) t calculated > t 0.001 = 3.390 – very significant differences *** ($t_{0.001} = 3.390$)					

Note: ABW-average breast weight; ALW-average legs weight; ABW-average back weight; AWW-average wings weight; ABP-average breast proportion; ALP-average legs proportion; ABP-average back proportion; AWP-average wings proportion.

The average weight of the wings (tab. 4) at the age of 42 days was 12.60 ± 0.51 g in females and 11.60 ± 0.55 g in males, with 8.62 % higher in females, the difference being insignificant ($t=1.386$). The average proportion of wings was 6.19 ± 0.39 % in females and 6.68 ± 0.19 % in males. The average weight of wings at the age of 49 days was 11.80 ± 0.49 g in females and 11.40 ± 0.51 g in males, 3.38 % higher in females, the difference being insignificant ($t=0.565$).

The average proportion of wings was 5.51 ± 0.24 % in females and 6.23 ± 0.20 % in males. The average weight of the wings at 56 days was 12.40 ± 0.51 g in females and 11.80 ± 0.37 g in males, by 4.83 % higher in females, the difference being uninsured statistically. The average proportion of wings was 6.68 ± 0.32 % in females and 6.26 ± 0.18 % in males.

CONCLUSIONS

From the point of view of the evolution of the average daily weight gain during the period 1-56 days, which decreases after 6 weeks, as well as the weight of the carcass and its component parts, conclusions can be drawn regarding the optimum age for slaughtering the Jumbo quails. This seems to be 42 days for both sexes, especially in the case of breeding in common until slaughter, 42 or 49 days for females (up to 7 weeks the weight gain decreases by only 3.44% compared to 6 weeks) and 42 days for males (between 1 to 7 weeks the weight gain decreases almost 3 times, with 9.98%, compared to the one from 1 to 6 weeks), especially in the case of separate breeding by sex. It is necessary to continue the research in order to take into account other factors on which the age of slaughter depends in particular the nutritional value of the combined food formulas, or the type of feeding (two-phase, with two combined food recipes, or three-phase, with three combined food recipes, of which the latter is to be of finishing).

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