

# STUDY ON THE INFLUENCE OF COMPOUND FEED SUPPLEMENTATION WITH FISHMEAL ON EGG PRODUCTION IN JUMBO MEAT QUAILS DURING 1-8 MONTHS OF EGG LAYING

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## Abstract

In order to determine the effect of supplementing the compound feed for Jumbo laying meat quails with fishmeal, an experiment was organized on a number of 400 laying quails, for an eight-month laying period. The quails were divided into two equal batches (experimental and control). The average percentage of eggs was  $80.75 \pm 1.42$  %, higher by 11.88 % in quails from the experimental group compared to quails in the control group. The average weight of egg was of  $12.20 \pm 0.15$  g, higher in quails in the experimental group by 5.27 % compared to that recorded in the control group.

The average consumption of compound feeds was lower in the experimental group with 9.37 % compared to that registered in the control group.

Specific consumption of compound feeds, lower in the experimental group by 28.52 % compared to the control group, was of  $47.61 \pm 0.95$  g.

Research shows that the supplementation of combined fodder with fishmeal leads to superior results in the production of eggs in Jumbo meat quails. Thus, it may be recommended to use a percentage of 4% in compound feed intended for laying quail, especially breeding quail, where the requirements for egg production are higher.

**Key words:** quail, production, compound feed, fishmeal

## INTRODUCTION

Quail breeding for meat production is a real source of animal protein for humans both individually and in intensive growth. Intensive growth of growth began around 1920 in Japan after which this activity spread to the United States and Europe between 1930 and 1950 [3].

In our country, domestic quail was imported from Italy in 1967, from France in 1970 and from Japan in 1974 [2].

The growth of quails developed a lot, especially after the Second World War, currently being selected specialized lines in the direction of meat, egg or mixed production. By the way, [8] presents a series of peculiarities regarding the selection of

quails and their selection techniques. The same author also mentions that the achievement of valuable technical and economic results is conditioned by the quality of the biological material, the conditions of maintenance and microclimate, the state of health of the animals and the quality of the combined feeds administered to them. Among the factors that greatly influence the productivity of quails, are the nutrition of both youth and adult quails [1]. In general, recipes of compound feeds administered to adult quails contain plant-based feed (cereals, grits) and vitamin-mineral, feed of animal origin being excluded mainly for economic reasons. However, adult quails also need animal feed to avoid possible deficiencies, and their administration is necessary with especially in breeding lots. The recording of protein deficiencies in the compound feed

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administered to birds results in significant variations in the proportion of the different components and of chemical composition of the eggs [4].

The aim of the present experiment was to study the effect of supplementing the combined feed administered to adult breeding quails with a percentage of 4% fishmeal on egg production in meat quails of the brown jumbo population in the first eight months of laying.

[5] mentions that the protein in fishmeal has a high biological value due to its high amino acid content, primarily methionine and lysine, but also threonine, tryptophan and cystine. The same author mentions that fishmeal is rich in calcium and potassium phosphate, which gives it an appreciable mineral value and also that it is rich in vitamins A, B, D, K, especially vitamin B12.

## MATERIAL AND METHOD

The researches were carried out on a total of 400 laying quails divided into two equal batches, namely the experimental batch and the control batch during the 1- 8 months of laying eggs. The research was carried out in the quail farm Ioniță T. Lucian Individual Enterprise Gherghița Prahova, Romania.

The compound feed and fishmeal used in the experiment were purchased from specialized producers of compound feed and animal feed (IBNA Balotești - [www.ibna.ro/](http://www.ibna.ro/) feed for quails, turkeys and pheasants, and S.C. Agromar S.R.L. Balotesti/[www.agromar.ro](http://www.agromar.ro)).

The compound feeds used in the experiment had the nutritional values shown in Table 1.

Table 1 The nutritional values of the combined feeds used in the experiment for the two batches of quails

Specification	Control group	The experimental group
Metabolisable energy (kcal ME/kg c.f.)	2800	2811.52
Crude protein (%)	18.20	20.76
Lysine (%)	0.78	0.98
Methionine (%)	0.38	0.58
Calcium (%)	3.12	3.12
Phosphorus (%)	0.67	0.67
Salt (%)	0.40	0.40

The structure of the combined feed recipes included cereals, soybean meal, corn gluten, calcium carbonate, dicalcium phosphate, amino acids, vitamin - mineral premix, antioxidant and salt (control group), to which fishmeal was added (experimental group).

The nutritional value of the fishmeal used in the experiment, determined by the manufacturer, is as follows : 2880 kcal ME /kg, 64 % crude protein, 10 % crude fat, 5 % methionine, 5 % lysine. It should be noted that fishmeal was analysed by the manufacturer bacteriologically for salmonella

and pathogenic microflora and tested negative.

The environmental conditions in which the experiment was carried out were within the limits provided by the literature.

The data obtained were processed using Microsoft Excel 2010 and the Student test was used to test the differences between averages.

## RESULTS AND DISCUSSIONS

1. Evolution of the average percentage of laying eggs in quails from the two groups during the 1-8 months of laying

The average percentage of laying (tab. 2, fig. 1) in the first month of laying was in the experimental group of  $55 \pm 0.76\%$ , with 10% higher compared to that recorded in the control group ( $45\% \pm 0.85\%$ ), the difference being very significant.

In the second laying month, the average percentage of laying was 10% higher in the experimental group where it recorded  $80 \pm 2.15\%$  compared to the control group, which was  $70 \pm 1.97\%$ , the differences being very significant.

Table 2 The average percentage of laying eggs and average egg weight in quails from the two groups during 1-8 months of laying

Eggs month	Average percent of laying (%)		Average egg weight (g)	
	Control group	Experimental group	Control group	Experimental group
I	$45 \pm 0.85$ aaa	$55 \pm 0.76$ aaa	$9.10 \pm 0.34$ bns	$9.35 \pm 0.23$ bns
II	$70 \pm 1.97$ aaa	$80 \pm 2.15$ aaa	$11.25 \pm 0.87$ bbb	$12.25 \pm 0.33$ bbb
III	$73 \pm 2.05$ aaa	$85 \pm 3.21$ aaa	$11.85 \pm 0.55$ b	$12.45 \pm 0.45$ b
IV	$75 \pm 2.16$ aaa	$88 \pm 3.67$ aaa	$11.95 \pm 1.07$ b	$12.56 \pm 1.06$ b
V	$77 \pm 3.43$ aaa	$93 \pm 4.76$ aaa	$12.04 \pm 1.12$ b	$12.75 \pm 1.33$ b
VI	$73 \pm 3.25$ aaa	$84 \pm 3.44$ aaa	$12.25 \pm 0.89$ b	$12.84 \pm 1.15$ b
VII	$70 \pm 2.06$ aaa	$83 \pm 2.87$ aaa	$12.15 \pm 1.22$ b	$12.75 \pm 1.06$ b
VIII	$68 \pm 1.87$ aaa	$78 \pm 2.54$ aaa	$11.87 \pm 0.77$ b	$12.65 \pm 0.95$ b
I-VIII	$68.88 \pm 1.23$ aaa	$80.75 \pm 1.42$ aaa	$11.56 \pm 0.13$ b	$12.20 \pm 0.15$ b

Note : ans/bns - the differences are insignificant; a/b – the differences are significant; aa/bb – the differences are distinct significant; aaa/bbb – the differences are very significant

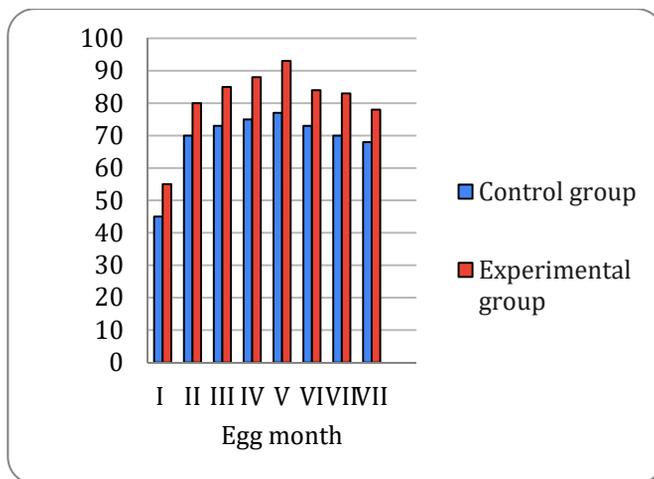


Fig. 1 Evolution of the average percentage of laying eggs

In the 3rd month of laying, the percent of laying was 12 % higher in the experimental group ( $85 \pm 3.21$  %) compared to the control group ( $73 \pm 2.05$  %), the differences also being very significant.

In the fourth month of laying, the intensity of laying was of  $88 \pm 3.67$  % in the experimental group, 13 % higher compared to the control group ( $75 \pm 2.16$  %), the difference being very significant between the groups.

In the 5th month of laying, the average laying rate was of  $93 \pm 4.76$  % in the experimental group, 16 % higher compared to the control group ( $77 \pm 3.43$  %), the difference between groups being very significant.

In the 6th month, the laying intensity was 11 % higher in the experimental group ( $84 \pm 3.44$  %) compared to the control group ( $73 \pm 3.25$  %), the difference being very significant.

In the 7th month, the average laying rate was 13 % higher in the experimental group ( $83 \pm 2.87$  %) compared to the control group ( $70 \pm 2.06$  %), the difference being very significant.

In the 8th month of laying, the average percent of laying was of  $78 \pm 2.54$  % in the experimental group, higher by 10 % compared to the control group ( $68 \pm 1.87$  %), the difference between the groups being very significant.

The average percent of laying in the period 1- 8 months of laying was of  $80.75 \pm 1.42$  %, in the experimental group, 11.88 % higher compared to that recorded in the control group ( $68.88 \pm 1.23$  %), the difference between groups being very significant.

In a study conducted in Russia [6] on meat quail flocks, a percentage of laying eggs was determined between 82.90 - 83.60 % in the laying peak (established by the authors in the 3-4 months of laying). In the quails from the present study, the laying peak was recorded in the 4 - 5th month of laying (75 - 77 % in the control group and 88 - 93 % in the experimental group).

## 2. The evolution of average egg weight in the quails from two groups during 1- 8 months of laying

The average weight of egg (tab. 2) in the first month of laying was higher with 2.67% in the experimental group ( $9.35 \pm 0.23$  g),

compared to the control group ( $9.10 \pm 0.34$ g), the difference being insignificant.

In the 2th month of laying, the average weight of the egg in the experimental group was of  $12.25 \pm 0.33$  g, higher by 8.16 % compared to the control group, in which the weight was of  $11.25 \pm 0.87$  g, the difference between the groups being very significant.

In the 3th month of laying, the egg weight was higher by 4.82 % in the experimental group ( $12.45 \pm 0.45$  g) compared to the control group ( $11.85 \pm 0.55$  g), the difference being significant.

In the 4th month of laying, the average weight of egg in the experimental group was of  $12.56 \pm 1.06$  g, higher by 4.86 % compared to control group, in which it was of  $11.95 \pm 1.07$  g. The difference between the groups was significant.

In the 5th month of laying, the average egg weight was of  $12.75 \pm 1.33$  g in the experimental group, 5.57% higher compared to the control group, in which it was of  $12.04 \pm 1.12$ g, the difference being significant between the groups.

In the 6th month of laying, the egg weight was higher by 4.60 % in the experimental group ( $12.84 \pm 1.15$ g) compared to the control group ( $12.25 \pm 0.89$  g), the differences being significant.

In the 7th month of laying, the average weight of the egg was in the experimental group of  $12.75 \pm 1.06$  g, higher with 4.71 % compared to the control ( $12.15 \pm 1.22$  g), the differences being significant.

In the 8th month of laying, the egg weight was 6.17 % higher in the experimental group ( $12.65 \pm 0.95$  g) compared to the control group ( $12.65 \pm 0.95$  g), the differences being significant.

During the 1 - 8 month of laying the average weight of the egg was of  $12.20 \pm 0.15$ g in the experimental group, 5.27% higher compared to the control group, which was of  $11.56 \pm 0.13$  g. The difference between the groups was significant.

In the russian study [6], an average egg weight between 11.90 and 12.80 g over the entire period of laying (30 weeks) is mentioned.

In a study conducted on a flock of Pharaoh meat quails in Poland [9], the authors established an average egg weight of 10.20 g in the first month of laying, 11.10 g in the 3rd, 10.50 g in the 4th month and 12.20 g in the 6th month of laying.

**3. The evolution of the average live weight in the two quails groups during 1 - 8 months of laying**

The average live weight (tab. 3) in the first month of laying was 4.87 % higher in the experimental group (226 ± 2.78 g) compared to the control group (215 ± 3.55 g), the difference between groups being very significant.

In the second month of laying, the average live weight in the experimental group was of 255 ± 5.65 g, higher by 7.84 % compared to the control group, which was of 235 ± 4.78 g, the difference being very significant between groups.

In the 3th month of laying, the live weight was 10.58 % higher in the experimental group (274 ± 4.65 g) compared

to the control group (245 ± 5.65 g), the difference being very significant.

In the 4th month of laying, the live weight was of 283 ± 4.79 g in the experimental group, higher by 9.19 % compared to the control group, in which it was of 257 ± 4.67 g. The difference between the groups was very significant.

In the 5th laying month, the live weight was 10.62 % higher in the experimental group (292 ± 5.23 g) compared to the control group (261 ± 5.03 g), the differences being very significant.

In the 6th month of laying, the average live weight was of 297 ± 4.73 g in the experimental group, 9.76 % higher compared to the control group in which it was of 268 ± 4.09 g, the difference being very significant.

In the 7th month of laying, the live weight was of 301 ± 5.15 g in the experimental group and of 275 ± 5.75 g in the control group. The difference of 8.64%, higher in the experimental group, was very significant.

Table 3 The average live weight, compound feed consumption and specific consumption of compound feed in the two quails groups during 1-8 of month laying

Eggs month	Average live weight (g)		Average compound feed consumption (g/head/day)		Average specific consumption (g/egg)	
	Control group	Experimental group	Control group	Experimental group	Control group	Experimental group
I	215±3.55ccc	226±2.78ccc	38.25 ± 1.16d	35.65±0.98d	85.00±2.14e	64.81±0.67e
II	235±4.78ccc	255±5.65ccc	39.55±1.34ddd	36.27±0.76ddd	56.50±2.45e	45.31±1.85e
III	245±5.65ccc	274±4.65ccc	39.86±1.05ddd	36.55±1.34ddd	54.60±1.87e	43.01±2.15e
IV	257±4.67ccc	283±4.79ccc	40.55±0.87ddd	37.86±1.32ddd	54.07±0.87e	43.02±1.55e
V	261±5.03ccc	292±5.23ccc	40.75±0.60ddd	38.00±1.56ddd	52.92±0.95e	40.86±1.23e
VI	268±4.09ccc	297±4.73ccc	42.56±1.87ddd	38.15±2.17ddd	58.30±1.78e	45.42±0.55e
VII	275 ± 5.75ccc	301±5.15ccc	43.65±1.54ddd	39.23±1.96ddd	62.35±1.56e	47.27 ± 0.85
VIII	283 ± 6.15ccc	305±4.55ccc	44.75±2.15ddd	39.94±1.78ddd	65.81±0.65e	51.21 ± 1.11e
I-VIII	254.88±2.80ccc	279.13±3.38ccc	41.24±0.28ddd	37.71±0.18ddd	61.19±1.32e	47.61 ± 0.95

Note : cns/dns/ens - the differences are insignificant; c/d/e – the differences are significant; cc/dd/ee – the differences are distinct significant; ccc/ddd/eee – the differences are very significant

In the 8th month of laying, the average live weight was 7.21 % higher in the experimental group ( $305 \pm 4.55$  g) compared to the control group ( $283 \pm 6.15$  g), the differences being very significant.

During the 1-8 months of laying the average live weight was of  $279.13 \pm 3.38$  g in the experimental group, higher by 8.69 % compared to the control group ( $254.88 \pm 2.80$  g), the difference being very significant between groups.

#### 4. Evolution of the average consumption of compound feeds for quails from the two groups during the period of 1-8 months of laying

The average consumption of compound feeds (tab. 3) in the first laying month, in the experimental group was  $35.65 \pm 0.98$  g, lower by 7.29 % compared to the control group, in which it was of  $38.25 \pm 1.16$  g, the difference between lots being significant.

In the second month of laying, the consumption of compound feeds was lower by 9.04 % in the experimental group, which was of  $36.27 \pm 0.76$  g, compared to the control group ( $39.55 \pm 1.34$  g), the difference being very significant.

In the 3th month of laying the average consumption of feeds was lower by 9.06 % in the experimental group ( $36.55 \pm 1.34$  g) compared to the control group ( $39.86 \pm 1.05$  g), the difference being very significant.

In the 4th month of laying, the average consumption of feeds was lower by 7.11 % in the experimental group ( $37.86 \pm 1.32$  g) compared to the control group ( $40.55 \pm 0.87$  g), the difference being very significant.

In the 5th month of laying, the consumption of compound feeds was of  $38.00 \pm 1.56$  g in the experimental group, lower by 7.24 % compared to the control group ( $40.75 \pm 0.60$  g), the difference being very significant.

In the 6th laying month of, the average consumption of feed was lower by 11.56 % in the experimental group ( $38.15 \pm 2.17$  g) compared to the control group ( $42.56 \pm 1.87$ g), the difference being very significant.

In the 7th month of laying, the consumption of compound feed was lower by 11.27 % in the experimental group, which was of  $39.23 \pm 1.96$  g, compared to the control ( $43.65 \pm 1.54$  g), the difference being very significant.

In the 8th month of laying, the consumption of compound feed was 12.04 % lower in the experimental group ( $39.94 \pm 1.78$  g) compared to control group ( $44.75 \pm 2.15$ ), the difference being very significant.

During the 1- 8 month laying period, the consumption of compound feed was, in the experimental group, of  $37.71 \pm 0.18$  g, lower by 9.37 % compared to the control group ( $41.24 \pm 0.28$  g), the difference being very significant.

#### 5. Evolution of the average specific consumption of compound feeds on quails from the two groups during the 1-8 month of laying period

The specific consumption of compound feeds (tab. 3, fig. 2) in the first month of laying was 31.15% lower in the experimental group ( $64.81 \pm 0.67$  g) compared to the control group ( $85.00 \pm 2.14$  g), the difference being significant between the two groups.

In the second month of laying, the specific consumption was lower by 24.70 % in the experimental group ( $45.31 \pm 1.85$  g) compared to the control group ( $56.50 \pm 2.45$  g), the difference being significant.

In the 3th month of laying, the specific consumption in the experimental group was of  $43.01 \pm 2.15$  g, lower by 26.95 % compared to the control group ( $54.60 \pm 1.87$  g), the difference between groups being significant.

In the 4th month of laying, the specific consumption was 25.69 % lower in the experimental group ( $43.02 \pm 1.55$ g) compared to the control group ( $54.07 \pm 0.87$  g), the difference being significant.

In the 5th month of laying, the specific consumption in the experimental group was of  $40.86 \pm 1.23$  g, lower by 29.52 % compared to the control, in which it was of  $52.92 \pm 0.95$ g, the difference being significant between the two groups.

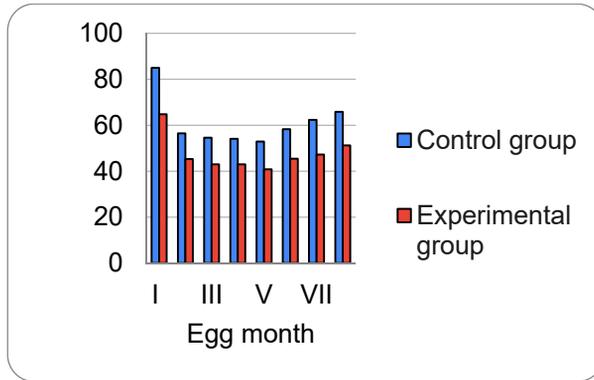


Fig. 2 Evolution of the average specific consumption of compound feeds

In the 6th laying month, the specific consumption was 28.36 % lower in the experimental group ( $45.42 \pm 0.55$  g) compared to the control group ( $58.30 \pm 1.78$ g), the difference between the two groups being significant.

In the 7th laying month, the specific consumption of feed was 31.90 % lower in the experimental group ( $47.27 \pm 0.85$  g) compared to the control group ( $62.35 \pm 1.56$ g), the difference being significant.

In the 8th month of laying, the specific consumption was 28.51 % lower in the experimental group ( $51.21 \pm 1.11$ g) compared to the control group ( $65.81 \pm 0.65$  g), the difference being significant.

The average specific consumption of compound feed during the period 1 - 8 month of laying, of  $47.61 \pm 0.95$  g in the experimental group, was 28.52% lower compared to the control group ( $61.19 \pm 1.32$ g), the difference being significant between groups.

In a study conducted in Brazil [7] on quail flocks of egg-type and meat-type in 5 months (17-19 weeks) of laying, the following performance was determined for meat-type: average laying percentage of 91.60 %, average egg weight of 13.19 g, average live weight of 240 - 270 g, average consumption of compound feed of 30.04 g and average specific consumption of 2.5 kg c. f./ kg eggs.

## CONCLUSIONS

Research on the influence of fishmeal feed supplementation on Jumbo meat quails during 1 to 8 months of laying has shown the following:

- the average intensity of laying was of  $80.75 \pm 1.42$  % in the experimental group, higher by 11.88 % compared to the one registered at the control group ( $68.88 \pm 1.23$  %);
- the average egg weight was of  $12.20 \pm 0.15$  g in the experimental group, 5.27% higher compared to the control group, in which it was of  $11.56 \pm 0.13$  g;
- the average live weight was 8.69% higher in the experimental group in which it was of  $279.13 \pm 3.38$  g, compared to the control group ( $254.88 \pm 2.80$  g);
- the average consumption of compound feed was of  $37.71 \pm 0.18$  g in the experimental group, lower by 9.37 % compared to the control group ( $41.24 \pm 0.28$  g);
- the average specific consumption of compound feed was of  $47.61 \pm 0.95$  g in the experimental group, 28.52% lower compared to  $61.19 \pm 1.32$  g in the control group.

In view of the superior results obtained in the case of the experimental group, it may be recommended to use a supplement of 4% fish meal in the compound feed intended for laying Jumbo meat quails, especially for breeding purposes.

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