Scientific Papers. Series D. Animal Science. Vol. LVI
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN-L 2285-5750

STUDY ON DENSITY IN SHELTER AND THE EFFECT OF A VITAMIN-MINERAL SELENIUM PREMIX IN YOUNG QUAILS OF THE BALOTEŞTI POPULATION

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Abstract

In order to establish an optimal density per unit area, and the effect of administration of a selenium vitamin-mineral supplement in the diet of young quails during 0-14 days of life, an experiment was organized on an initial number of 1200 chickens one day old of Baloteşti population between the ages of 1 and 42 days. For the experiment chicks were divided into four equal groups, namely a control group (300 chicks) and 3 experimental groups (each 300 chicks per group).

Following research is recommended to use a density per unit area that decreases faster during the growth, of 300 chickens / square meter during 0-3 days of growth, 200 chickens / sq. m during 4-7 days of life, 150 chicken / sq. m during days 8-21 and of 100 chickens / sq. m during 22-42 days. This leads to superior results with over 10% in young quails mass growth, with a reduction in death rate of 20%, without significant influence over combined feed consumption and feed utilization. Small differences of only 2.47% in live weight, 2.34% in average daily gain, 1.23% in combined feed consumption, by 2.72% in specific consumption and considerable effect of 3% in the death rate of the group with the same low experimental density, recommends the administration of a vitamin-mineral product with selenium in young quails growing, while used density above. Administration of selenium had a greater influence on death rate, which was reduced by 13.7% in the group with high density, equal to that of the control group.

Key words: *density, quail, youth, selenium.*

INTRODUCTION

Quail is the smallest bird species raised for meat and eggs (Panda and Singh, 1990). Japanese quail growth witnessed great development in recent decades due to the biological characteristics of this bird, which causes high production levels and economic efficiency and because of the market requirements for eggs and quail meat with recognized quality (high biological and nutritional value, special taste) and recommended by natural medicine for their therapeutic effect. Among the main productive characteristics of quail stands out: rapid rate of growth (reach adult weight at 5-6 weeks after hatching), early sexual maturity, short interval between generations, high rate of laying, low feed consumption and reduced space accommodation (Adeogun and Adeoye, 2004). To determine the quail productive parameters in Romania were conducted and continue to conduct research on biological material existing in one of the largest quail farm in Romania (Popescu-Micloșanu et al., 2008).

MATERIALS AND METHODS

The aim of the experiment was to determine, on one hand the optimal density per unit area in young quail of Baloteşti population between 0-42 days of life and secondly to determine the effect of administering a vitamin-mineral supplement on the basis of selenium, 'Selevit', in young quails during 0-14 days of life.

The research was conducted within the quail farm of Gheorghița common, Ungureni village, Lucian T. Ioniță individual society enterprise Bucharest.

Density used in the control group was of 300 chicken / m^2 during 0-7 days, 250 chicken / m^2 during 7-14 days of growth, 200 chicken / m^2 from 15 to 28 days of growth and 100 chicken / m^2 between 29-42 days of growth.

In experimental group I was used the same density as the control group and chicks have been given the vitamin-mineral supplement with selenium Selevit the first 14 days of life.

In the experimental group II, the following density per unit area was used: 300 chicken / m^2 during 0-3 days of growth, 200 chicken / m^2 during 4-7 days of life, 150 chicken / m^2 during 8-21 days and 100 chicken / m^2 during 22-42 days of growth. In the experimental group II, it was not used vitamin-mineral supplement with selenium.

In the experimental group III the same density as in the experimental group II was used, but their chicken were administered for 14 days the vitamin-mineral supplement with selenium in the drinking water.

Note that during days 0-28 chickens were maintained at ground, on permanent litter consisting of sterilized shavings in all analyzed groups and from the age of 28 days chicks were raised in battery cages with density of 100 chicken / cage sq. m A cage capacity is 50 heads.

Vitamin-mineral product 'Selevit' contains a concentration of 20000000 IU per ml A vitamin, 2,500 mg of vitamin B_2, 7.5 mg vitamin B_{12}, of 100000 IU of vitamin D3, 2,000 mg of vitamin K3, 1,250 mg of vitamin B_1, B_6 vitamin 1,750 mg, 2000 mg of vitamin C, vitamin E 5,500 mg, 6500 mg calcium pantothenate, folic acid 400 mg, 18,000 mg nicotiamide, of 4,000 mg methionine, 600 mg tryptophan, 4,000 mg lysine and 33 mg selenium / ml. The product was administered in drinking water at a dose of 5 ml product/10 l water. Were used 1000 g of vitamin-mineral product 'Selevit' in the two groups in the analyzed period.

The determinations refers to living weight and combined feed consumption ages at 1 day, 7, 14, 21, 28, 35 and 42 days. They also watched the actual stock losses. Measurements on live weight and combined feed consumption were performed by simple random sampling, individually, during 0-28 days period and on cage during 29-42 days of growth. Based on measurements made, weekly and daily gain, specific combined feed consumption, loss ratio in the analyzed groups were calculated. To test the significance of the differences was applied Fisher's test, followed by Turkey-test.

RESULTS AND DISCUSSIONS

1. Evolution of the average living weight of quail chicks in the 3 experimental groups compared with control group

At the age of 1 day was an average weight of 8.36 ± 0.23 g / capita in the control group, of 8.95 g / head ± 0.34 in the experimental group I, 8.74 ± 0.55 g /capita in experimental group II and 8.67 g / head ± 0.56 in the experimental group III, the differences between the 4 groups were insignificant.

Table 1. Live average weight in quail chickens from the 3 experimental batches compared to the control

Age	Control lot	Experimental lot I I	Experimental lot II	Experimental lot III
	$X \pm s_X$			
Day 1	8.36 ± 0.23 *ans bns cns*	8.95 ± 0.34 *ans dns ens*	8.74 ± 0.55 *bns dns fns*	8.67 ± 0.56 *cns ens fns*
Day 7	19.23 ± 2.35 *a bb ccc*	22.34 ± 2.55 *a dns ee*	24.54 ± 2.77 *bb dns f*	29.33 ± 2.67 *ccc ee f*
Day 14	52.00 ± 2.76 *aa bbb ccc*	58.88 ± 2.95 *aa dns e*	59.55 ± 2.65 *bbb dns f*	63.22 ± 2.78 *ccc e f*
Day 21	100.23 ± 3.56 *aa bb cc*	110.45 ± 4.33 *aa dns ee*	112.34 ± 4.23 *bb dns f*	120.33 ± 3.87 *cc ee f*
Day 28	134.45 ± 3.23 *aa bbb ccc*	145.45 ± 4.02 *aa dd eee*	155.34 ± 3.90 *bbb dd f*	160.45 ± 3.46 *ccc eee f*
Day 35	154.45 ± 4.45 *aa bbb ccc*	165.34 ± 3.68 *aa dd eee*	176.87 ± 4.03 *bbb dd f*	180.67 ± 3.96 *ccc eee f*
Day 42	178.65 ± 3.78 *aa bbb ccc*	188.95 ± 4.34 *aa dd eee*	198.74 ± 3.45 *bbb dd f*	203.78 ± 3.78 *ccc eee f*

At the age of 7 days was an average weight of 19.23 ± 2.35 g / head in control group, of 22.34 ± 2.55 g / capita in experimental group I, 24.54 ± 2.77 g / capita in experimental group II and 29.33 ± 2.67 g / head in the experimental group III. Distinct significant differences were between the control group and experimental group I, distinctly significant between the control group and experimental group II and very significant between control and experimental group III. Between experimental group I and experimental group II there were insignificant differences, between experimental

group I and group III distinct significant and between the experimental group II and III were only significant differences.

At the age of 14 days there was an average weight of 52.00 ± 2.76 g / head in control group, of 58.88 ± 2.95 g / capita in experimental group I, 59.55 ± 2.65 g / capita in experimental group II and 63.22 ± 2.78 g / head in the experimental group III. There were signifycant differences between the control and experimental group I, distinctly significant between the control and experimental group II and highly significant between the control and experimental group III. Between experimental group I and experimental group II differences were not significant, between the experimental group II and III were distinctly significant differences. Between the experimental group II and III were only significant differences.

At the age of 21 days there was an average weight of 100.23 ± 3.56 g / capita in the control group, 110.45 ± 4.33 g / head in experimental group I, 112.34 ± 4.23 g / capita in experimental group II and 8.67 g / head ± 0.56 in the experimental group III. Distinct significant differrences were between the control group and experimental group I, experimental group II and III. Between experimental group I and experimental group II there were not significant differences, between the experimental group I and III they were distinctly significant, between the experimental group II and III differences were only significant.

At the age of 28 days there was an average weight of 134.45 ± 3.23 g / capita in the control group, 145.45 ± 4.02 for g / head in experimental group I, 155.34 ± 3.90 g / capita in experimental group II and 160.45 ± 3.46 g / head in the experimental group III. Distinct significant differences were between the control and experimental group I and very significant differences between the control group and experimental groups II and experimental III. Between experimental batch I and experimental group II there were distinctly significant differences, between experimental group I and experimental group III there were very significant, while between experimental group II and experimental group III differences were only significant.

At the age of 35 days there was an average weight of 154.45 ± 4.45 g / capita in the control group, 165.34 ± 3.68 for g / head in experimental group I, 176.87 ± 4.03 g / head in group II and 180.67 ± 3.96 g / head for the group III. Distinct significant differences were between the control and experimental group I and very significant differences between the control and groups II and III. Between experimental group I and group II there were distinctly significant differences, between the experimental group II and III they were very significant, between the group II and III differences were only significant.

At the age of 42 days there was an average weight of 178.65 ± 3.78 g / capita in the control group, 188.95 ± 4.34 g / head in group I, 198.74 ± 3.45 g / capita in group II and 203.78 ± 3.78 g / head in the experimental group III. Distinct significant differences were between the control group and experimental group I and very significant differences between the control group and experimental groups II and III. Between group I and II were distinctly significant differences, between group I and III there were very significant, while between experimental group II and III differences were only significant.

During the period when chickens were maintained on the ground, average live weight per unit area at 1 day in control group was 2508 kg / sq. m, 4807 kg / sq. m at the age of 7 days, 13,000 kg / sq. m at the age of 14 days, 20,046 kg / sq. m at the age of 21 days, 26,890 kg / sq. m at 28 days. Average live weight per unit area of the cage at the age of 35 days was 15,445 kg / sq. m, while at the age of 42 days it was 17,865 kg / sq. m.

In experimental group I when the chickens were maintained on ground, average live weight per unit area at 1 day was of 2685 kg / sq. m, 6702 kg / sq. m at the age of 7 days, 14,700 kg / sq. m at the age of 14 days, 22,090 kg / sq. m at the age of 21 days, 29,090 kg / sq. m at 28 days. Average live weight per unit area of the cage at the age of 42 days was 18,895 kg / sq. m, 5.5% higher than for the control lot.

During the period when chickens were maintained on the ground, average live weight per unit area at 1 day in experimental group II was 2622 kg / sq. m, 4908 kg / sq. m at the age of 7 days, 8933 kg / sq. m at the age of 14 days,

16,851 kg / sq. m at the age of 21 days, 15,534 kg / sq. m at 28 days. Average live weight per unit area of cage at the age of 35 days was 17,687 kg / sq. m, while at the age of 42 days it was 19,874 kg / m² (10.1% greater than the control).

In the experimental group III, in the period when chickens were maintained on the ground, average live weight per unit area at 1 day was 2601 kg / sq. m, 5866 kg / sq. m at the age of 7 days, 9483 kg / sq. m at the age of 14 days, 18,050 kg / sq. m at the age of 21 days, 16,045 kg / sq. m at 28 days. Average live weight per unit area of cage at the age of 42 days was of 20,378 kg / m², 12.3% higher than the control.

2. Evolution of average weekly gain in quail chicks of the 3 experimental groups compared to the control

In the first week of life, there was a daily average gain of 10.87 g / head in control group, of 13.39 g / capita in experimental group I, 15.8 g / capita in experimental group II and 20.66 g / head ± 0.56 in experimental group III, the differences between the 4 groups were not statistically assured.

In the second week of life, there was a daily average gain of 32.77 ± 1.23 g / head in control group, of 36.54 ± 1.47 g / capita in experimental group I, 35.01 ± 1.35 g / capita in experimental group II and of 33.89 ± 1.55 g / head for the experimental group III, the differences between the 4 groups were not statistically assured.

In the third week of life, there was an average daily gain of 48.23 ± 1.45 g / head in control group, of 51.57 ± 1.83 g / capita in experimental group I, 52.79 ± 1.74 g / capita in experimental group II and of 57.11 ± 2.05g/capita for the group III, the differences between the 4 groups were not statistically assured.

In the fourth week of life, there was an average daily gain of 34.22 ± 2.37 g / head in control group, of 35.00 ± 2.15 g / capita in experimental group I, 43.00 ± 2.56 g / capita in group II and of 40.12 ± 2.10 g / head for the experimental group III, the differences between the 4 groups were not statistically assured.

In the fifth week of life, there was a daily average gain of 26.23 ± 2.45 g / head in control group, of 24.88 ± 2.02 g / capita in experimental group I, 23.21 ± 2.90 g / capita in group II and 25.98 ± 2.32 g / head for the group III, the differences between the 4 groups were statistically assured as follows: not significant between the control group and experimental group I, significant differences between control group and group II, not significant between control group and experimental group III. Between group I and II differences were significant, as in the group I and III. Between the experimental group II and experimental group III there were significant differences.

Table 2. Average weekly gain in quail chickens from the 3 experimental lots compared to the control lot

Age period	Control lot	Experimental lot I	Experimental lot II	Experimental lot III
	$X \pm s_X$			
Week I	10.87 ± 0.75	13.39 ± 0.88	15.80 ± 0.45	20.66 ± 1.34
Week II	32.77 ± 1.23	36.54 ± 1.47	35.01 ± 1.35	33.89 ± 1.55
Week III	48.23 ± 1.45	51.57 ± 1.83	52.79 ± 1.74	57.11 ± 2.05
Week IV	34.22 ± 2.37	35.00 ± 2.15	43.00 ± 2.56	40.12 ± 2.10
Week V	26.23 ± 2.45 *ans b cns*	24.88 ± 2.02 *ans d e*	23.21 ± 2.90 *b d f*	25.98 ± 2.32 *cns e f*
Week VI	17.97 ± 1.34 *ans b cns*	18.62 ± 1.68 *ans d e*	20.19 ± 1.03 *b d f*	17.35 ± 1.97 *cns e f*
Total I-VI week	170.29	180.00	190.00	195.11
Average I - VI week	28.38 ± 5.37	30.00 ± 5.67	31.67 ± 5.89	32.52 ± 5.99

In the sixth week of life, there was an average gain of 17.97 ± 1.34 g / head in control group of 18.62 ± 1.68 g / capita in experimental group I, 20.19 ± 1.03 g / capita in experimental group II and 17.35 ± 1.97 g / head for the experimental group III, the differences between the 4 groups were significant among the experimental group II and control groups and experimental I. The differences between the 4 groups were statistically assured as follows: not significant between the control and experimental group I, significant differences between control and experimental group II, not significant between control group and experimental group III.

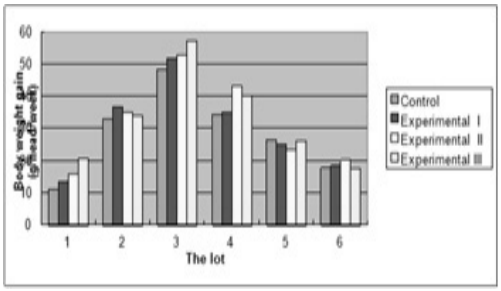

Figure 1. The evolution of average weekly gain in quails chickens for the 4 analyzed lots in the growth period of 1-6 weeks

Between experimental group I and II differences were significant, as in the experimental group I and III. Between the experimental group II and III there were significant differences.

3. Average weekly combined feed consumption trends in the quail chicks of the 3 experimental groups compared with controls from I to VI weeks of growth

Table 3. Average consumption of combined fodder for the 3 experimental lots of quails chicks compared to the control lot in the period of growth I - VI

Specification	Control lot	Experimental lot I	Experimental lot II	Experimental lot III
		$X \pm s_X$		
Week I	30.50 ± 1.68	31.65 ± 1.87	32.76 ± 1.55	33.23 ± 2.24
Week II	69.65 ± 2.33	71.33 ± 2.43	72.45 ± 2.89	73.35 ± 2.85
Week III	110.87 ± 2.76	115.67 ± 2.99	119.45 ± 3.05	123.56 ± 2.38
Week IV	134.56 ± 1.98	137.45 ± 3.15	137.77 ± 2.65	139.15 ± 3.56
Week V	169.55 ± 2.65 *ans* *dns* *cns*	171.24 ± 2.13 *ans* *dns* *ens*	173.12 ± 1.95 *bns* *dns* *fns*	175.35 ± 3.16 *cns* *ens* *fns*
Week VI	182.15 ± 2.45 *ans* *bns* *cns*	185.24 ± 2.18 *ans* *dns* *ens*	186.34 ± 2.14 *bns* *dns* *fns*	188.67 ± 3.96 *cns* *ens* *fns*
Total I-VI weeks	697.28	712.58	721.89	733.31
Average I-VI weeks	182.15 ± 2.45 *ans* *bns* *cns*	185.24 ± 2.18 *ans* *dns* *ens*	186.34 ± 2.14 *bns* *dns* *fns*	188.67 ± 3.96 *cns* *ens* *fns*

In the first week of life, there was an average of 30.50 ± 1.68 g combined feed consumption / head in control group, of 31.65 ± 1.87 g / capita in experimental group I, 32.65 ± 1.55 g / capita in experimental group II and of 32.76 ± 2.24 g / head for the experimental group III; the differences between the 4 groups were not statistically assured.

In the second week of life, there was an average consumption of 69.65 ± 2.33 g combined feed g / head in control group, of 71.33 ± 2.43 g / capita in experimental group I, 72.45 ± 2.89g/capita in the experimental group II and of 73.35 ± 2.85 g / head for the experimental group III; the differences between the 4 groups were not statistically assured.

In the third week of life, there was an average of 110.87 ± 2.76 g combined feed / capita in the control group, 115.67 ± 2.99 g / head in experimental group I, 119.45 ± 3.05 g / capita in group II and 123.56 ± 2.38 g / head for the group III; the differences between the 4 groups were not statistically assured.

In the fourth week of life, there was an average of 134.56 ± 1.98 g combined feed / head in the control group, 137.45 ± 3.15 g / head in experimental group I, 137.77 ± 2.65 g / capita in group II and 139.15 ± 3.56 g / head for the group III; the differences between the 4 groups were not statistically assured.

In the fifth week of life, there was an average of 169.55 ± 2.65 g combined feed / head in the control group, 171.24 ± 2.13 g / head in experimental group I, 173.12 ± 1.95 g / cap in group II and of 175.35 ± 3.16 g / head for the group III; the differences between the 4 groups were not significant.

In the sixth week of life, there was an average of 182.15 ± 2.45 g combined feed / capita in the control group, 185.24 ± 2.18 g / head in experimental group I, 186.34 ± 2.14 g / capita in group II and 188.67 ± 3.96 g / head for the group III; the differences between the 4 groups were not significant.

4. Specific consumption evolution in quail chicks of the 3 experimental groups compared with controls from I to VI growth weeks

In the first week of life, there was a specific consumption of 2.81 ± 0.23 g compound

feed / g weight gain in the control group, 2.36 ± 0.34 in the group I, 2.06 ± 0.17 in the group II and 1.61 ± 0.25 in the group III; the differences between the 4 groups were not statistically assured.

In the second week of life, there was a specific consumption of 2.13 ± 0.14 g compound feed / g weight in the control group, of 1.95 ± 0.55 in the group I, 2.07 ± 0.88 in the group II and 2.16 ± 0.67 in the group III; the differences between the 4 groups were not statistically assured.

Table 4. Specific consumption evolution in quail chicks of the 3 experimental groups compared with controls from I to VI growth weeks

Growth period	Control lot	Experimental lot I	Experimental lot II	Experimental lot III
X ± s				
Week I	2.81 ± 0.23	2.36 ± 0.34	2.06 ± 0.17	1.61 ± 0.25
Week II	2.13 ± 0.14	1.95 ± 0.55	2.07 ± 0.88	2.16 ± 0.67
Week III	2.30 ± 1.13	2.24 ± 0.23	2.26 ± 0.35	2.16 ± 0.75
Week IV	3.93 ± 0.36	3.92 ± 1.35	3.20 ± 1.35	3.47 ± 1.68
Week V	6.46 ± 1.35 *ans* *b* *cns*	6.88 ± 2.76 *ans* *dns* *ens*	7.46 ± 2.37 *b* *dns* *fns*	6.75 ± 2.78 *cns* *ens* *fns*
Week VI	10.14 ± 2.65 *ans* *bns* *cns*	9.95 ± 2.75 *ans* *dns* *fns*	9.23 ± 1.93 *bns* *dns* *fns*	10.87 ± 2.55 *cns* *ens* *fns*
Average I-VI weeks	4.62 ± 1.28 *ans* *bns* *cns*	4.55 ± 1.34 *ans* *bns* *cns*	4.38 ± 1.28 *ans* *bns* *cns*	4.50 ± 1.48 *ans* *bns* *cns*

In the third week of life, there was a specific consumption of 2.30 ± 1.13 g combined feed / g weight gain in the control group, 2.24 ± 0.23 for the group I, in experimental group II of 2.65 2.26 ± 0.35 and 2.26 ± 0.35 for the batch III; the differences between the 4 groups were not statistically assured.

In the fourth week of life, there was a specific consumption of 3.93 ± 0.36 in the control group, 3.92 ± 1.35 for the group I, 3.20 ± 1.35 in the group II and 3.47 ± 1.68 for the group III; differences between the 4 groups were not statistically assured.

In the fifth week, there was a specific consumption of 6.46 ± 1.35 g combined feed / weight gain in the control group, 6.88 ± 2.76 for the group I, 7.46 ± 2.37 in the group II and 6.75 ± 2.78 for the group III; the differences between the 4 groups were statistically assured as follows: significant differences between control and experimental group II and not significant otherwise.

In the sixth week, there was a specific consumption of 6.46 ± 1.35 g combined feed / g weight gain in the control group, of 6.88 ± 2.76 in group I, 7.46 ± 2.37 in group II and 6.75 ± 2.78 for the group III; the differences between the 4 groups were not significant.

5. Evolution of death rate in quail chicks of the 3 experimental groups compared with controls from I to VI growth weeks

In the first week of life, was an average death rate of 8.33% in the control group, of 3.33% in the group I, in the group II of 2.33% and 1% for the group III; the differences between the 4 groups were statistical assured in favor of experimental groups.

Table 5. Evolution of death rate for quails chicks from the 3 experimental lots compared to the control lot for the period of growth I to VI weeks In

Growth period	Control lot		Experimental lot I		Experimental lot II		Experimental lot III	
	head	%	head	%	head	%	head	%
Week I	25	8.33	10	3.33	7	2.33	3	1
Week II	14	4.67	8	2.67	4	1.33	1	0.33
Week III	12	4	8	2.67	2	0.67	1	0.33
Week IV	9	3	7	2.33	2	0.67	1	0.33
Week V	8	2.67	2	0.67	0	0	0	0
Week VI	8	2.67	0	0	0	0	0	0
Total I-VI weeks	76	25.33	35	11.67	15	5.00	6	2.00
Average/ week I-VI	12.67	4.22 ± 0.88	5.83	1.94 ± 0.53	2.5	0.83 ± 0.36	1	0.33 ± 0.14

In the second week of life, there was an average death rate of 4.67% in the control group, of 2.67% in the group I, in group II of 1.33% and 0.33% for the group III, the differences between the 4 lots being statistically assured.

In the third week, there was an average death rate of 4% in the control group, 2.67% in the group I, in group II of 0.67% and 0.33% for the group III, the differences between the 4 lots being statistically assured.

In the fourth week, there was a 3% average death rate in the control group of 2.33% in the group I, in group II of 0.67% and 0.33% for the group III, the differences between the 4 lots being statistically.
In the fifth week of life, there was an average death rate of 2.67% in the control group and 0.67% in the experimental group I, the differences between the 4 groups being statistically assured. In the other groups were not quails lost.
In the sixth week of life, there was an average death rate of 2.67% in the control group; the other groups did not registered death rate.
In a study by Ragab S. et al. (2002) an average weight at age 42 days similar to that determined for the population Baloteşti quail (199.89 g / head) was found, a somewhat lower weight gain (167.67 g / head / period) and a specific consumption of 6.93 g mixed fodder / g weight gain was determined.
In another study by Khalil, H. (2009) the following parameters of growth in young quail are mentioned: live weight at the age of 42 days of 246.98 g / head, weight gain of 238.04 g / head / period, feed consumption of 902.76 g / head / period, specific consumption of 4.06 g / g weight gain).

CONCLUSIONS

1. **The weight between 1-6 weeks in quail chicks from the 4 groups analyzed**

If at the age of one day the live weight of chickens in the 4 groups was approximately the same in all 4 groups analyzed, the differences among them being not significant, from the age of 7 days the differences were significant between control group (with density used normally in the farm and without vitamin-mineral supplementation) and experimental group I (who applied density control group, but taking vitamin-mineral supplement with selenium), experimental groups II (which was applied experimental density and not receiving vitamin-mineral supplement) and experimental III (which was applied experimental density and taking vitamin-mineral supplement). Between experimental group I and II the difference was not significant and between experimental I and III distinctly significant and between experimental group II and III only significant. The differences occurred at ages of 14, 21, 28, 35 and 42 days were alike the same.

Highest weight at age 42 days was recorded for the experimental group III (203.78 ± 3.78 g / head), while the lowest live weight was recorded for the control group (178.65 ± 3.78 g / head) that did not apply any treatment. Live weight at 42 days of age was 5.45% higher in experimental group I, 10.11% in experimental group II and 12.33% higher in experimental group III compared to the control group. Between the control group and group II, with lower density, the difference was very significant, of 10.11%, in favor of group II. Between groups with supplementation of selenium and without supplement, but with the same density, the differences were quite small. Thus, between group II and group III there was a difference of only 2.5%. These results recommend using experimental density in parallel to the use of vitamin-mineral selenium product.

2. Average weekly weight gain in quail chicks of analyzed groups in period I - VI growth weeks

Average weekly weight gain per total studied period showed a similar trend with live weight, respectively the average weekly gain was 5.39% higher in experimental group I, 10.37% higher in experimental group II and 12.72% in the experimental group III compared with controls. Weekly weight gain increased steadily until the third week, when there was the highest in all 4 analyzed groups (between 48.23 ± 1.45 g / capita in the control group and 57.11 ± 2.05 g / capita in group III) and then gradually decreased until the sixth week of growth. Between groups with supplementation of selenium and without supplement, but with the same density, the differences were quite small. Thus, the difference between controls and group I was only 5.4%, and between group II and III of 2.62%.

3.The evolution of the average weekly mixed feed consumption and specific consumption in the analyzed quail chicks groups in the period I - VI weeks of growth

Between 1-VI weeks of growth in the control group the total combined feed consumption was of 697.28 g / capita, with 15.2% less than in the experimental group I, 3.40% less than the

group II and 4.91% less than the group III (who had a total consumption of 733.31 ± 5.99 combined feed g / head), the differences being not statistically assured.

Also, during 1-6 weeks of growth, in the control group was obtained the highest average specific consumption of 4.62 ± 1.28 g mixed feed / g weight gain, with 1.63% more than in the experimental group I, 5.60% less than the experimental group II and 2.72% less than the experimental group III; differences between groups were not significant.

4. Evolution of the average death rate in the analyzed quail chicks groups in period I - VI weeks of growth

The highest death rate between 1-6 weeks of growth was recorded in the control group, of 25.33%, with 13.66% more than the experimental group I, 20.33% more than group II and 23.33% more than group III. Differences were evident for lower density lots and those with selenium supplementation.

As a general recommendation following investigations, the use of a density per unit area to decrease faster during the growth, of 300 chicken / sq. m during 0-3 days of growth, 200 chicken / sq. m. during 4-7 days of life, 150 chicken /sq. m during 8-21 days of growth and 100 chicken / sq. m during 22-42 days of growth brings superior results in raising young quails. Recommendation is justified by obtaining a body weight and weight gain higher with more than 10% and a reduction in death rate of 20.33%, without affecting feed and specific consumption.

Whereas differences between, on one hand, control and experimental groups I (with the same density and without, respectively with selenium) and on the other hand, experimental II (where experimental density was applied, but not received vitamin-mineral product with selenium) and experimental group III (which was applied experimental density, but taking vitamin-mineral product) are small, of only 2.47% in live weight, of 2.34% in average daily gain, of 1.23% in mixed feed consumption, of 2.72% in specific consumption and 3% in death rate (between group II and III), results that taking selenium vitamin-mineral product tends to achieve superior performances in raising young quails while obvious improving viability by using density in experimental II.

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