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Research Article

Solving the Problem of Stress in Egg Farm Poultry

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ANNOTATION.

Here are presented the experimental results of study of effectiveness of applying stress medications “Vitaminoacid” and “Magic Anti-stress Mix” in the technology of growing and housingrearing flocks and laying hens and cocks of the“High Line Brown”crossbreed parent stock. The influence of the tested medications on the growth rates of rearing flocks, the development of the reproductive organs of birds, the use of feed nutrients and energy exchange, the productivity and reproductive qualities of laying hens and roosters, the safety of livestock, and the incubatory qualities of eggs; are determined. It has been established that the use of stress medications “Vitaminacide” and “Magic Anti-stress Mix”, as a part of the system of stress prevention among individuals of the parent flock, favorably affects the rates of growth and development of rearing flocks and adult birds, which is manifested in the increase in live body weight, homogeneity, more intense growth of reproductive organs, in comparison with the matched control group. Feeding of this additives leads to an increase in the egg productivity of laying hens: reduction of time of laying the first egg, the increase in the egg top production capacity, the gross of egg production and the percentage of production of the incubation egg, the fertilization of eggs, and the release of conditioned chickens. An increase in the intensity of egg laying and egg production capacity on the average laying hen was found in the group that received the “Magic Anti-stress Mix”. Chickens, whose diet included “Vitaminoacid”, were inferior to the matched control group for the same indicators. According to theobtained results, it is revealed that “Magic Anti-stress Mix” has a more pronounced effect positively affecting a bird's ability to rhythmic egg-laying from the time of reaching sexual maturity to slaughter. The positive effect of applying of this medications is explained by the favorable set of components that make up their composition, which excludes the antagonistic interactions of the elements among themselves, allowing completely or partially to eliminate the deficit of biologically active substances and normalize metabolic processes under stressful industrial production conditions.

Keywords: stress medications, rearing flocks, parent stock, stress, growth, development, use of nutrients, energy exchange, egg production.

1. INTRODUCTION

Nowadays the terms “stress” and “stress factor” have become very widespread [4; 20]. The amount of stress that an industrial bird encounters in the course of life is very significant. It can be fodder stresses, environmental, social, technological or internal stress. Stress can lead to a decrease in food intake (e.g., mycotoxins or high temperature) and disruption of the intestinal structure, which leads to an imbalance of nutrients and biologically active substances, a decrease in egg production, a deterioration in shell quality and egg structure [4; 10]. The losses caused by a stressful condition of the bird are very significant, which adversely affects the economy of poultry production [8].Stress can be

prevented by selecting a resistance to individual stressors, creating optimal conditions for maintenance and developing biologically full-fledged diets [5; 7; 9; 11]. Experience in organizing and keeping poultry in conditions of industrial methods shows that prevention of forced stress situations is impossible without the use of a complex of biologically active substances and feed additives that mitigate impact of stress factors [1; 2; 3; 6].

"Vitaminoacid" and "Magic Anti-stress Mix" are ones of the nowadays stress medications. These additives are multifunctional in their composition, contributing to the maximum mobilization of the body's defense systems. "Vitaminoacid" includes a complex of vitamins: calcium pantothenate, nicotinamide, choline, ascorbic acid, as well as essential amino acids. "Magic Anti-stress Mix" consists of natural antioxidants, fat and water-soluble vitamins, minerals, essential amino acids, hepatoprotectors, osmoregulators, electrolytes, organic acids and appetite stimulants.

2. USE OF ANTISTRESS PREPARATIONS IN ANIMAL POULTRY POISONING

We present the results of studying the effect of medications "Vitaminoacid" and "Magic Anti-stress Mix" on the growth and development of rearing flocks, the productivity and reproductive qualities of laying hens and roosters of the crossbreed parent stocks.The research was carried out in the production conditions of the Poultry Farm "Borovskaya". The object of the study was the rearing flock, hens and roosters of the"High Line Brown" crossbred parent stock. Formation of groups for experiments, as well as scientific bases of the research, was carried out in accordance with the recommended methods of Russian Academy of Agricultural Sciences. By the method of analogues there were formed 3 groups (one matched control group and two experimental groups) with 1-day-old chickens: 2000 female and 400 male chickens in each group. When birds were transferred into the main herd (106 days old), the number of hens and roosters in the experimental groups was 1938 female and 176 male chickens. The duration of the experiment is 448 days.The control group received the main diet (MD) - full-fledged fodder in accordance with the recommendations of Russian Academy of Agricultural Sciences, 2009. During the whole experiment, birds of the first experimental group was fed with "Vitaminoacid" in addition to the MD in a dose 50 ml of medication added in 100 liters of water according to the following scheme: first 1-5 days of life (vaccination against avian infectious bronchitis); 9-13 days of life (debeaking of chickens, their sorting); 21-25, 27-31 days of life (vaccination against infectious bursitis of the chicken); 45-49 days of life (sorting of birds into the lower tier); 63-67 days of life (vaccination against avian infectious laryngotracheitis); 75-79 days of life (transportation); 106-111 days (vaccination against avian rhinotracheitis, Newcastle disease, avian infectious bronchitis, infectious bursitis of the chicken, Egg drop syndrome - during the first egg production period), 148-157 days (approaching peak of egg production); 238-246 days (peak of egg production). The second experimental group received the "Magic Anti-Stress Mix" in addition to the MD in dose 100 g / 100 l of water according to a scheme similar to the first experimental group. In the course of the research, the dynamics of the live body weight and uniformity of the poultry and safekeeping oflivestock, were taken into account; the development of digestive and reproduction organs of birds was evaluated; the digestibility, use of nutrients feed and energy exchange was studied; egg production of breeding hens was analyzed.

3. DYNAMICS OF GROWTH AND DEVELOPMENT OF BREEDING CHICKENS

The addition of stress medications toMD had a positive effect on the growth dynamics of the poultry of parent stock and its homogeneity throughout life. So, when "Vitaminoacid" and "Magic Anti-Stress Mix" were fed, the superiority of chickens of experimental groups over the matched control group in live body weight was: in rearing hens - 5.15 and 2.17%; laying hens - 0.73 and 0.73%; for rearing roosters - 4,46 and 1,06; adult roosters - 1,33

and 3,04%. The homogeneity of hens was higher by 1.08 and 5.49%, of roosters by 6.95 and 9.30%, of laying hens by 2.90 and 8.13%, the homogeneity of rooster in the second experimental group increased, compared with the matched control group of 7.41% (Table 1).

Table 1 Dynamics of live body weight and safekeeping of hens and roosters of the "High Line Brown" crossbred parent stock

Age	Groups		
	Matched control group	First experimental group	Second experimental group
Live body weight of hens, in g			
1 day	38,66±0,25	38,55±0,25	38,97±0,26
15 weeks	1200,81±8,79	1275,58±8,84***	1242,15±8,38***
26 weeks	1822,17±14,50	1838,67±12,84	1859,80±10,73*
56 weeks	1962,42±13,49	1967,87±12,42	1961,87±11,08
Safe keeping during 15 weeks, in %	98, 44	98,89	98,96
Safe keeping during 16-64 weeks, in %	97,37	97,47	97,78
Live body weight of roosters, in g			
1 day	38,21±0,24	37,54±0,25	38,82±0,26
15 weeks	1746,56±29,27	1826,22±22,29*	1757,11±30,53
26 weeks	2408,00±33,69	2412,89±18,23	2431,78±22,25
56 weeks	2451,11±31,20	2498,44±25,52	2553,33±30,69*
Safe keeping during 15 weeks, in %	93,87	94,81	95,25
Safe keeping during 16-64 weeks, in %	97,16	97,73	98,3

Note: the degree of reliability * P≤0,05; ** P≤0.01; *** P≤0,001 here and further in comparison with matched control group

"Vitaminacide" and "Magic Anti-stress Mix" contributed to the improvement of the livestock safekeeping. The best safekeeping of chickens in age up to 15 weeks was observed in the second experimental group (Table 1). The difference with the matched control group was 0.52% in female and 1.38% in male chickens. The safekeeping of hens of the first experimental group was at the level of 98.89%, which is 0.45% higher than in the matched control group. The safekeeping index of roosters in this group exceeded the control group by 0.94%.

The highest safekeeping index during the period from 16 to 64 week was between laying hens and roosters of second experimental group, this indicator was above than in the matched control group by 0.41% and 1.14%.

Birds of the first experimental group did not differ significantly in safekeeping from the matched control group during the period of 16-64 weeks: the excess over the control group was 0.10% in hens and 0.57% in roosters.

4. DEVELOPMENT OF INTERNAL ORGANS OF BIRDS OF THE PARENT STOCK

The use of stress medications led to a better development of the reproductive organs of birds in experimental groups (Table 2). The weight of the ovary in the chickens of the first and second experimental groups at the age of 15 weeks was higher by 20.00% and 25.00% respectively, the weight of the oviduct by 41.67% and 13.89%, and the length of the oviduct by 12.15% and 17.48%, than in the matched control group. Hens were distinguished by better growth of combs, which is an indication of their earlier physiological maturity. The weight of testicles in the males of first and secondexperimental groups was above the matched control group at 4.76% and 135.24% (P≤0.05), respectively. More intensive rates of development of reproduction organs in birds of experimental groups at young age have been preserved even in the productive period. Thus, in hens of first and second experimental groups, at the 56-week-old age, the ovary mass exceeded the

control group by 11.02% and 10.30%, the weight of the oviduct by 7.38% and 13.14% (P≤0.05), the length of the oviduct - by 5.73% and 12.42% (P≤0.05), respectively. The testicles weight of roosters of first and second experimental groups exceeded the matched control group by 2.93% and 8.70% (P≤0.05) at the age of 26 weeks; and by 5.53% and 12.80% (P≤0.05) at the age of 56 weeks.

Table 2 Anatomic development of reproductive organs in parent stock

Index	Groups		
	Matched control group	First experimental group	Second experimental group
Hens aged15 weeks			
Live body weight, in g	1202,00±30,55	1278,00±31,64	1244,67±14,34
Oviduct weight, in g	1,08±0,15	1,53±0,09	1,23±0,09
Oviduct length, in cm	10,70±1,15	12,00±1,32	12,57±0,90
Hens aged26 weeks			
Live body weight, in g	1822,00±8,08	1839,00±1,53	1859,00±9,54*
Oviduct weight, in g	59,02±3,45	56,90±0,17	70,63±2,19*
Oviduct length, in cm	65,00±3,46	72,50±2,60	76,50±2,02*
Roosters aged15 weeks			
Live body weight, in g	1744,00±33,01	1826,00±11,37	1758,00±3,06
Testicles weight, in g	1,05±0,08	1,10±0,09	2,47±0,30*
Roosters aged26 weeks			
Live body weight, in g	2408,00±5,77	2412,00±6,93	2431,50±10,10
Testicles weight, in g	22,88±0,49	23,55±0,05	24,87±0,06*

5. DIGESTABILITY AND USE OF NUTRITIONAL SUBSTANCES

Balance experiments have shown that the use of stress medications contributes to increasing the use and exchange of nutrient feed in the body of poultry. With the introduction of "Vitaminoacid", the utilization of nitrogen in hens and roosters, compared to matched control, was higher by 4.19% and 3.87%; calcium by 7.91% (P≤0.05) and 7.82% ; phosphorus - by 5.32% and 4.32%.

In hens and males that received the "Magic Anti-stress Mix", the nitrogen utilization rate exceeded the matched control values by 9.59% (P≤0.05) and 5.48%; calcium by 12.25% (P≤0.01) and 7,53% (P≤0.01); phosphorus - by 9.52% and 2.47%. In hens that was fed with "Vitaminoacid" the utilization of nitrogen was slightly below the matched control value - by 0.06%, and calcium and phosphorus higher - by 2.77% and 6.60%. For roosters that received "Vitaminoacid", the utilization of nitrogen exceeded the matched control by 6.65%, calcium and phosphorus was inferior - by 0.82% and 0.87%. In birds that received "Magic Anti-Stress Mix", , there was an excess over matched control values in all elements. So, the utilization of nitrogen, calcium and phosphorus in hens was higher - by 1.64%; 5.90% (P≤0.05) and 1.89%; for roosters by 8.50% (P≤0.01), 2.18% and 8.93% (P≤0.01).

The use of "Vitaminoacid" and "Magic Anti-stress Mix" increases the intensity of energy exchange in the body of experimental birds, increasing energy of growth in comparison with the matched control values in hens by 0.66% and 1.99%, in roosters - by 2.68 %, in laying hens - by 2.50% and 5.00%, in adult roosters - by 3.73% and 5.59%.

6. EGG PRODUCTIVITY OF THE PARENT STOCK

Feeding of medications "Vitaminoacide" and "Magic Anti-stress Mix" had a positive effect on the egg productivity of laying hens (Table 3), accompanied by decrease of time of laying the first egg (less for3 and 2 days), exceeding the peak productivity by 0.21% and 2.65% and an increase in the output of hatching eggs by 0.1% and 1.0%.

Table 3 Egg productivity of the laying hens of the parent stock of "High Line Brown" crossbred for the entire period of the experiment

Index	Groups		
	Matched control group	First experimental group	Second experimental group
Age, when laying the 1st egg, in days	108	105	106
Peak of productivity, in %	94,25	94,46	96,90
Egg production intensity, in %	86,51	86,00	87,03
Egg production capacity per average laying hen	263,55	262,91	268,12
Gross of egg production	504958	505836	517200
Output of hatching eggs, in %	80,6	80,7	81,6

There was an increase in theegg productionintensity in the group receiving “Magic Anti-stress Mix” by 0.52% and in egg production capacity per average laying hen by 1.7%. Hens, whose diet included “Vitaminoacid”, were inferior to the matched control for the same indicators by 0.5% and 0.2%. Despite the lagging of hens of the first experimental group in contrast to the matched control group for a number of parameters, the total gross of egg production for the entire period of the experiment was higher by 878 eggs or 0.17%, compared to the control group. In the second experiment group, the excess over the control group over the gross egg production was more significant - 12242 eggs (2.42%). Analysis of the qualities of hatching eggs indicated that the fertilization of eggs in hens of the first experiment group at the age of 26-56 weeks exceeded the control group by 0,06 - 3,04%; in second experimental group - by 2,52 - 3,71% (Fig. 1).

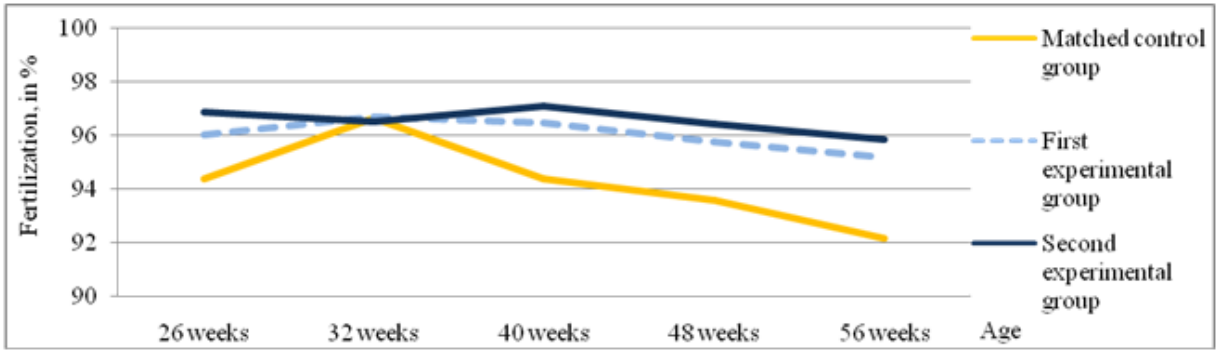

Figure 1 – Egg fertilizationof experimental laying hens, in %

On the background of high fertilization, the output of chickens from eggs of hens of first and second experimental groups exceeded the control group by 0.89-3.47% and 2.08-4.94% (Fig. 2).

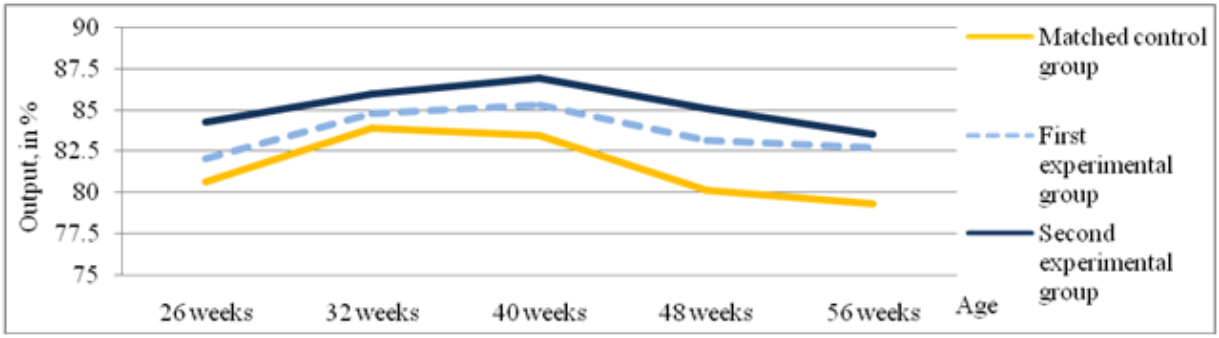

Figure 2 – The output of chickens from eggs of experimental laying hens, %

The percentage of substandard chickens of first and second experimental groups was lower by 0.02-1.57% in comparison with the control group for the period of the experiment.It should be noted that, in contrast to the control group and first experimental group, the number of chickens hatched from eggs of the second experimental group, who received the “Magic Anti-stress Mix” exceeded the number of roosters at age of26-, 32-, 48 and 56 weeks by

0.81%, 0.74% 0.53% and 0.78%, and only at age of 40 weeks hens was slightly less (by 0.09%) than the roosters.

7. CONCLUSIONS

1. Stress has a negative impact on the general condition of birds, on the formation of immunity, the productivity decreases. Therefore, anti-stress measures (creation of optimal conditions of keeping, full ration meals, increasing resistance of birds, use of stress medications) are an obligatory component of modern industrial technologies in poultry farming.
2. On the basis of the obtained results, the expediency of using stress medications “Vitaminoacid” and “Magic Anti-stress Mix” in the technology of raising rearing flocks, also during the productive period of laying hens and roosters of the parent stock of the “High Line Brown" crossbred was experimentally confirmed.
3. The positive effect of these medications is explained by the favorable set of components that make up their composition, which excludes the antagonistic interactions of the elements among themselves, allowing completely or partially to eliminate the deficit of biologically active substances and normalize the metabolic processes in the tense conditions of industrial production. The medications have significant adaptogenic properties that help the body not to waste its resources on the unproductive energy under influence of stress factors, but to use them for productive purposes.

8. CONCLUSION

According to the obtained experimental data, it can be concluded that adding stress medications “Vitaminoacid” and “Magic Anti-stress Mix”in the ration of breeding poultry on the background of stress factors has a favorable effect on the growth and development of rearing flocks and adult livestock, which is manifested in an increase in its live body weight, homogeneity, more intensive development of the reproductive organs in comparison with the matched control group.

The additives helps to increase egg productivity of laying hens: a reduction of time of laying the first egg, the increase in egg production, the gross of egg productionand the percentage of output of hatching eggs, the fertilization of eggs and the output of chickens. An increase in the egg laying intensity and egg-laying on the average laying hen was found in the group that received the “Magic Anti-stress Mix”. Chickens, whose diet included “Vitaminoacid”, were inferior to the matched control for the above indicators.

It can be stated that “Magic Anti-stress Mix” has a more pronounced effect favorably affecting a bird's ability to rhythmic egg-laying from the time of reaching sexual maturity to slaughter.

9. CONFLICT OF INTERESTS

The authors confirm that the presented data do not contain a conflict of interest.

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