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"STUDY OF THE YIELD FEATURES, BEHAVIORAL AND ANATOMO-PHYSIOLOGICAL ADAPTABILITY OF SOME LAYING HYBRIDS WITHIN THE CONDITIONS OF DIFFERENT RAISING ALTERNATIVE SYSTEMS"

STAGE 2010
- single stage -

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SUMMARY

1. Researches goal
2. Experimental design
3. The biological material
4. Applied research methods
5. Achieved results on brief

1. RESEARCHES GOAL

Laying hens in battery operation, in accordance with the super-system is a basic practice in modern poultry farming, because approx. 75% of the existing manpower in the world are grown in such a system in order to provide eggs for immediate consumption needs, but also for the processing industry (powdered eggs).

New regulations on animal welfare have otherwise required the application of principles in poultry, is affected, especially the production of eggs for consumption, which is prohibited to use in battery cages in closed halls.

For these reasons, the practice of poultry have been introduced to increase the so-called alternative systems, which reproduce certain elements of the natural habitat of birds living in the idea of ensuring the welfare condition.

Although there have been many attempts to design and implementation of technological equipment to increase egg-producing hens, the results were not conclusive enough, the economic results from the tests were unsatisfactory, productive and behavioral responses varied in very wide limits for problems and found the veterinary supervision of staff.

In line with these considerations is the purpose of this research, which we plan to study how laying hen hybrids are adapted to different growing conditions provided by operating systems.

2. EXPERIMENTAL DESIGN

Single stage per 2010 comprised 3 goals with theri activities. The last 2 goals are focused on the contract finishing:

Goals	**Activities**
1. Evaluation of the genotype B reactivity at the provided rearing conditions	1.1. Analysis of biochemical traits, on age periods 1.2. Evaluation of quantitative and qualitative meat production issued at fowl slaughtering 1.3. Assessment of the morpho-structural alterations in the somatic musculature
2. Overall assessment of the run activities	
3. Final analysis of the achieved results	

The 1st goal included the the studz of of genotype B – "Lohmann Brown" response to the conditions provided by certain technological solutions, as following:

- accommodation and rearing in size-modified cages;
- accommodation and rearing in opened cages;
- accommodation and rearing on permanent litter;
- accommodation and rearing on permanent litter, at ground, in halls providing externat access.

The 1st goal activities were achieved withn 3 experimental series, briefly presented in tables 1-3.

Table1

Experimental design for Exp. I

Notice	Lotul de experienţă		
	Lc-1B	Lexp-1B	Lexp-2B
Husbandry system	superintensive	superintensive	superintensive
Brooding density	4 hens/cage of 2000 cm^2	5 hens/cage of 3000 cm^2	6 hens/cage of 6000 cm^2
Cage type	standard	modified	modified
Cage surfce /hen (cm^2)	500	600	1000
Brooding flock (cap)	432	435	432
Cages amount	108	87	72
Cages size (cm)	L=40; w= 50	L=60; w= 50	L=120; w= 50
Cage surface (cm^2)	2000	3000	6000

Tabelul 2

Experimental design for Exp. II

Notice	Lotul de experienţă	
	Lc-1B	Lexp-3B
Sitemul de creştere	superintensive	intensive
Brooding density	4 hens /cage of 2000 cm^2	4 cap/cage of 2000 cm^2
Cage type	standard	Modified
Cage surfce /hen (cm^2)	500	500 cm^2 nesting+resting cage and 500 cm^2 feed and water intake cage
Brooding flock (cap)	432	432
Cages amount	108	108
Cages size (cm)	L=40; w= 50	L=40; w= 50
Cage surface (cm^2)	2000	2000

Tabelul 3

Experimental design for Exp. III

Notice	Lc-2B	Lexp-4B
Husbandry system	intensive	Semiintensive
Husbandry technology	permanent litter	permanent litter, panel with sleeping poles and acces toward oute padock
Compartments area	252 m^2	252 m^2
Brooding density	6.0 hens /m^2	7.5 hens /m^2
Brooding flock size	1512 hens	1890 hens
Feeding room	10 cm/ hen	
Water intake room	3 cm/ hen	
Nests	1 nest/5 hens	

3. THE BIOLOGICAL MATERIAL

The biological material was represented by hybrid laying hen "Hisex Brown"

Poultry type Hisex Brown, after the age of 20 weeks of light provide a programrequires 14 hours / day and a luminous intensity of 10 lux.

Growth temperature in the hall must be provided at a level of 20 oC and relative humidity at 75-80%.

Feed is different, in terms of quality, depending on the time of laying, when practicehigher levels of linoleic acid in the ratio (over 2.5%) there is an increase in mass of eggs produced.

Ambient temperatures above +30 ° C leads to reduced feed consumption, theinconvenience can be remedied by using a balanced feed, with a high energy content,an adequate level of amino acids and a decreased percentage of protein, plus and management cold water.

Feed consumption is influenced by the energy requirements of birds, and feed energylevel, when ambient temperatures are too high or feed energy level is too high, there isa decrease in feed consumption, in which case compensation should be applied , to increase the amount of amino acids, vitamins and minerals in the ration given

During the period of laying is very important to ensure the necessary calcium. In thisrespect, it is recommended that at least 50% of calcium added to the feed to becomposed of coarse particles (broken shells or limestone) to make up the necessary reserves of mineral crust formation, which takes place largely at night.

Additional amount should be given daily calcium requirement is the difference betweendaily calcium intake of calcium daily.

Since the calcium content of shells and calcium carbonate is about 40%, grams ofcalcium to be added will be multiplied by 2.5 resulting in a daily supplement of calciumcarbonate shells and each bird returns (in grams) , it is usually 5-20 kg / ton of feed.The best way to handle the shells fragment is the end of feeding.

Under normal conditions, the hybrid "Hisex Brown productive parameters presented in table record 4 and 5.

Table 4

Morpho-productive traits in “Hisex Brown” hybrid (1)

Age (weeks)	Laying intensity (%)	Egg weight (g)	Eggs yield from whole fowl flock			Eggs yield from initial flock		
			Egg mass (g/day)	Cumulated		%	Cumulated	
				Pcs.	kg		pcs.	kg
1	2	3	4	5	6	7	8	9
18	-	-	0	0	0.0	0	0	0.0
19	6	47.0	3	0	0.0	6	0	0.0
20	20	49.0	10	2	0.1	20	2	0.1
21	50	50.6	25	5	0.3	50	5	0.3
22	78	52.2	41	11	0.6	78	11	0.5
23	90	53.5	48	17	0.9	90	17	0.9
24	92	54.8	50	24	1.2	92	23	1.2
25	93	55.9	52	30	1.6	93	30	1.6
26	94	57.0	54	37	2.0	93	36	2.0
27	94	57.7	54	43	2.4	93	43	2.3
28	94	58.4	55	50	2.7	93	50	2.7
29	94	59.0	55	56	3.1	93	56	3.1

1	2	3	4	5	6	7	8	9
30	94	59.5	56	63	3.5	93	63	3.5
31	93	59.9	56	69	3.9	92	69	3.9
32	93	60.4	56	76	4.3	92	75	4.3
33	93	60.7	56	82	4.7	92	82	4.7
34	93	61.1	57	89	5.1	92	88	5.1
35	92	61.4	56	95	5.5	91	95	5.4
36	92	61.7	57	102	5.9	91	101	5.8
37	92	61.9	57	108	6.3	90	107	6.2
38	92	62.0	57	115	6.7	90	114	6.6
39	91	62.2	57	121	7.1	89	120	7.0
40	91	62.4	57	127	7.5	89	126	7.4
41	91	62.5	57	134	7.9	89	132	7.8
42	90	62.7	56	140	8.3	88	138	8.2
43	90	62.9	57	146	8.7	88	145	8.6
44	89	63.0	56	153	9.1	87	151	8.9
45	89	63.2	56	159	9.5	87	157	9.3
46	88	63.5	56	165	9.9	86	163	9.7
47	88	63.6	56	171	10.2	85	169	10.1
48	87	63.7	55	177	10.6	84	175	10.5
49	87	63.9	56	183	11.0	84	181	10.8
50	86	64.0	55	189	11.4	83	186	11.2
51	86	64.1	55	195	11.8	83	192	11.6
52	85	64.2	55	201	12.2	82	198	12.0
53	84	64.4	54	207	12.6	81	204	12.3
54	84	64.5	54	213	12.9	81	209	12.7
55	83	64.6	54	219	13.3	80	215	13.0
56	83	64.7	54	225	13.7	80	220	13.4
57	82	64.8	53	231	14.1	79	226	13.8
58	81	64.9	53	236	14.4	78	231	14.1
59	80	65.0	52	242	14.8	77	237	14.5
60	80	65.2	52	247	15.2	76	242	14.8
61	79	65.3	52	253	15.5	75	247	15.2
62	78	65.4	51	258	15.9	74	253	15.5
63	77	65.5	50	264	16.2	73	258	15.8
64	77	65.6	51	269	16.6	73	263	16.2
65	76	65.7	50	274	16.9	72	268	16.5
66	75	65.8	49	280	17.3	71	273	16.8
67	75	66.0	50	285	17.6	71	278	17.2
68	74	66.1	49	290	18.0	70	283	17.5
69	73	66.2	48	295	18.3	69	288	17.8
70	72	66.3	48	300	18.6	68	292	18.1
71	72	66.4	48	305	19.0	68	297	18.4
72	71	66.5	47	310	19.3	67	302	18.7
73	70	66.5	47	315	19.6	66	306	19.1
74	69	66.6	46	320	19.9	65	311	19.4
75	68	66.6	45	325	20.3	64	315	19.7
76	68	66.6	45	330	20.6	64	320	20.0
77	67	66.7	45	334	20.9	63	324	20.2
78	66	66.7	44	339	21.2	62	329	20.5

Table 5

Morpho-productive traits in “Hisex Brown” hybrid (2)

Age (wks)	Feed intake		Feed comversion (kg/kg)		Cumulated mortality (%)	Live weight (g)
	g/day	Cumulated kg	weekly	Cumulated		
1	2	3	4	5	6	7
18	87	0.6	-	-	0.0	1490
19	97	1.3	-	-	0.1	1580
20	103	2.0	-	-	0.2	1670
21	105	0.7	4.15	2.77	0.1	1750
22	109	1.5	2.68	2.72	0.2	1820
23	112	2.3	2.33	2.57	0.3	1860
24	114	3.1	2.26	2.48	0.4	1900
25	114	3.9	2.19	2.42	0.5	1910
26	115	4.7	2.15	2.37	0.6	1920
27	115	5.5	2.12	2.33	0.7	1930
28	116	6.3	2.11	2.30	0.8	1930
29	116	7.1	2.09	2.27	0.9	1940
30	117	7.9	2.09	2.25	1.0	1950
31	117	8.8	2.10	2.24	1.1	1950
32	117	9.6	2.08	2.22	1.2	1960
33	117	10.4	2.07	2.21	1.3	1960
34	117	11.2	2.06	2.20	1.4	1960
35	117	12.0	2.07	2.19	1.5	1970
36	117	12.8	2.06	2.18	1.6	1970
37	117	13.7	2.05	2.17	1.7	1970
38	117	14.5	2.05	2.16	1.9	1970
39	117	15.3	2.07	2.16	2.0	1980
40	116	16.1	2.04	2.15	2.1	1980
41	116	16.9	2.04	2.15	2.2	1980
42	116	17.7	2.06	2.14	2.3	1990
43	115	18.5	2.03	2.14	2.4	1990
44	115	19.3	2.05	2.13	2.5	1990
45	115	20.2	2.04	2.13	2.7	1990
46	114	21.0	2.04	2.13	2.8	2000
47	114	21.7	2.04	2.12	2.9	2000
48	114	22.5	2.06	2.12	3.0	2000
49	113	23.3	2.03	2.12	3.1	2000
50	113	24.1	2.05	2.12	3.2	2010
51	113	24.9	2.05	2.11	3.3	2010
52	113	25.7	2.07	2.11	3.5	2010
53	113	26.5	2.09	2.11	3.6	2010
54	113	27.3	2.09	2.11	3.7	2020
55	112	28.1	2.09	2.11	3.8	2020
56	112	28.9	2.09	2.11	3.9	2020
57	112	29.6	2.11	2.11	4.0	2020
58	112	30.4	2.13	2.11	4.1	2020
59	112	31.2	2.15	2.11	4.3	2030
60	112	32.0	2.15	2.11	4.4	2030
61	112	32.8	2.17	2.11	4.5	2030

1	2	3	4	5	6	7
62	112	33.6	2.20	2.12	4.6	2030
63	112	34.3	2.22	2.12	4.7	2030
64	112	35.1	2.22	2.12	4.9	2040
65	112	35.9	2.24	2.12	5.0	2040
66	112	36.7	2.27	2.13	5.1	2040
67	112	37.5	2.26	2.13	5.2	2040
68	112	38.3	2.29	2.13	5.3	2040
69	112	39.1	2.32	2.13	5.5	2040
70	111	39.8	2.33	2.14	5.6	2050
71	111	40.6	2.32	2.14	5.7	2050
72	111	41.4	2.35	2.14	5.9	2050
73	111	42.2	2.38	2.15	6.0	2050
74	111	42.9	2.42	2.15	6.1	2060
75	111	43.7	2.45	2.16	6.3	2060
76	111	44.5	2.45	2.16	6.4	2060
77	111	45.3	2.48	2.17	6.5	2060
78	111	46.0	2.52	2.17	6.6	2060

The eggs laid by the "Hisex Brown" hens are graded in accordance with the criteria shown in *tab. 6.*

Tabelul 12

Proportionality of eggs classes, at certain ages of "Hisex Brown" hybrid

Weight class	Eggs weight (g)	Age (weeks):					
		30	40	50	60	70	78
XL	>73	0	1	3	6	9	10
L	63-73	22	44	55	62	66	67
M	53-63	71	53	41	32	25	23
S	<53	7	2	1	1	0	0
Average eggs weight (g)		59.5	62.4	64.0	65.2	66.3	66.7

4. APPLIED RESEARCH METHODS

During the research were followed several indicators measured by the working methods presented below:

- blood examinations were performed using automated analyzer ABX Micros ABC VET on blood samples collected vacumtainere.
- morphology of figurate cells – assessed by microscopy, on blood smears;
- slaughter yeld – calculated as follows:

$$\text{Slaughter yield (\%)} = \frac{\text{Carcass weight (kg)}}{\text{Live weight (kg)}} \text{ x100}$$

- weight-cut portions after cutting carcasses after slaughter results, we proceeded to weigh the anatomical components and then reporting their carcass weight;
- somatic muscle histology, using autopsy technique, from each bird slaughtered at the age of 80 weeks and somatic muscles were harvested 4 pair of 4 anatomic areas with special significance: Pectoralis superficialis (chest), biceps brachialis (wings), quadriceps femoris (thighs, hips) and Gastrocnemius lateralis (lower leg, legs). From each muscle pair were assigned and carving representative samples were then fixed in 10% formalin, impregnated with paraffin at 56 ° C and stained with Evans blue, acid magenta, resulting in histological slides by 100 per lot. They have been studied in the microscopic field

using a photon microscope trinocular, Motic DMB1-30, equipped with objective micrometer, micrometer eye image analysis software - Image Plus 2.0 and two types of digital cameras - Motic M230, FujiFilm Finepix A800.

Morpho-structural characteristics of the somatic muscles are given the values of histological parameters such as: large and small diameters of fibers, the average thickness and the area of their cross section. For each parameter studies were carried out with 100 readings per lot. Thus, myocytes measured analog and digitally captured images were processed to verify the analog micrometers and further calculations necessary to determine the mean diameter and area on cross section.

Main experimental data have been statistically processed, to obtain: mean ($\bar{x}$); std. deviation (s); std. mean deviation ($\pm s_{\bar{x}}$); variation coefficiant (V%).

Data were processed using ANOVA unifactorial algorithm, resulting in major statisticalestimators and significance of differences arising between the averages.

5. ACHIEVED RESULTS ON BRIEF

Following research on hybrid laying hen "Hisex Brown" have resulted in a number ofconclusions to say.

Experience I. Biochemical diagnosis showed the influence of growth (in terms of layingintensity achieved) the level of indicators, as for example, birds in group LC-1B,cholesterol showed an average of 148.29 mg / dl, lower by 5.98 to 9.99% than the experimental groups, a situation true for triglycerides (192.08 mg / dl vs. 193.1 to 193.92 mg / dl) and calcium (8.76 mg / dl Vs. 8.85 to 9.50 mg / dl). Other indicatorsshowed similar values between groups, with their classification in the normal term for laying hens.

Although the yield calculated for poultry slaughter in group LC-1B was 0.19 to 0.43%higher than the experimental groups (Lexp Lexp-1B and-2B), the share of mainanatomical regions was less than 0 0.61 to 1, 01% for breast, 0.62 to 1.00% for 0.19 to 0.34% for legs and wings. Lc-meat chickens in group 1B was fine, somethingproved by 35.31 μ value determined for the average thickness of muscle fibers, from35.61 to 35.86 μ as was the experimental birds.

Experience II. Analysis of blood collected from hens housed in cages open (Lexp-3B),compared with those grown in super-system (LC-1B), showed higher levels of 13.93%for cholesterol, triglycerides by 2.07% for With 23.91% to 26.17% for calcium andphosphorus in the rest, no major differences were noted between the two groups.

Freedom of movement enjoyed by birds reared in cages open (Lexp-3B) has contributed to a better development of certain anatomical regions (chest, legs andwings) compared with the hens in conventional battery (Lc-1B), but meat producedwas more than fine, so the average thickness of muscle fibers of the four musclesexamined was 38.31 μ, up from 35.31 μ in group LC-1B.

Experience III. In terms of biochemical indicators that are influenced by the rate of eggformation (cholesterol, triglycerides, calcium and phosphorus) have higher levelscompared with those determined in previous experiences, but without exceeding thelimits.

Findings influence the system of meat production growth has highlighted the superiorityof "free range" in terms of carcass weight of commercial interest regions (chest, legsand wings), up from 0.34 to 0.62% than in birds housed in the hall with litter, andsituated in the note to the average thickness of muscle fibers, which was 40.83 ingroup Lexp μ-4B, compared to 38.36 μ in laying lot Lc-2B, only this indicates a lessfine meat.

The conclusion of this study was that the system is exploited laying hen hybridsinfluence, to some extent, the constants in biochemical and quantitative and qualitativeproduction of meat produced.Thus, it was revealed that although biochemical indicators were within normal limits,the level of some of them were dependent on the intensity of laying done in conjunctionwith The farming technology.

Return to the slaughter showed low levels, lower poultry meat production specialist.However, it should be noted that conventional battery operated birds, the meatpresented higher histological features of the hens bred from other systems, althoughlower rates have resulted in anatomical regions cut from carcasses.

These data indicate that income should not be minimized which can be obtained from the meat after slaughter resulting hybrids of laying hens at the end of the production cycle.