PRODUCTIVE TRAITS OF TWO LAYING HYBRIDS REARED WITHIN CONVENTIONAL SYSTEMS (CAGE BATTERIES) IN SMALL SIZE FARMS

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Abstract

During 2009, an experiment has been carried on, in order to assess the best productive response between two commercial laying hybrids to the conditions provided by small farms endorsed with pyramidal cage system. There were used 500 Lohmann Brown hens (LB group) and 500 Hisex Brown hens (HB group) during the laying peak period (age 25-28 weeks). Microclimate and feed quality were provided in accordance with the technological guides, while feeding and eggs collection have been run manually. Certain production parameters were investigated: eggs yield, laying intensity, casualties and the ration between normal/abnormal shell eggs. Quantitative traits were analyzed for the entire flocks, while eggs quality was studied on 100 eggs/group, every week. The data achieved till the 28th week of fowl life suggested better adaptability of the Lohmann hens to the conditions of a small family farm (91.53% peak laying intensity, 0.80% cumulated mortality, 98.33% eggs with intact eggshell). The performances of the other hybrid were slightly lower (91.30% laying, 1.20% casualties and 98.16 % marketable eggs). Therefore, both hybrids could be used in small farm eggs production, as long as the microclimate and feeding environment is provided at the required levels. It would be provoking to assess the response of these hybrids to a free range husbandry system, run in small family farms, under the outdoor climate conditions of Kurdistan area.

Key words: laying hens, eggs, yield, casualties, shell integrity

INTRODUCTION

Poultry rearing is one of the most profitable activities within the animal husbandry wide field. It could be easily adapted for large scale exploitations or, as well, for small scale – familial type ones. There are regions in the world with certain strict regulations related to poultry welfare, and especially laying hens exploitation systems, such as the European Union [7], [8]. Through such researches as these we try to establish whether would be the most appropriate conditions for laying hens husbandry, including technologies and specific genotypes, in order to provide small farmers guidance in the decisions they have to made for survival and economic profitability. The aim of the study was to investigate the production response of two commercial strains of layers to the technical conditions provided by small scale poultry farms, during the most intense biological period of productivity.

MATERIAL AND METHOD

The experiment was conducted during 2009 year, in a small size farm, endorsed with three leveled pyramidal cage systems for laying hens. There have been used, as biological material, 1000 laying hens, aged 25-28 weeks (theoretic laying peak). 500 hens belonged to Lohmann Brown hybrid (LB group), while the other 500 belonged to Hisex Brown hybrid (HB group). Hens diet was provided in accordance to hybrid producer recommendation for the laying period. Thus, for Lohman Brown, feed was formulated to fulfill the requirements: 2800 Kcal Met. energy, 18.0 % Crude protein, 0.40% digestible Methionine, 0.60% digestible Methionine+Cystine, 0.66% digestible Lysine, 3.50% Calcium, 0.40% available Phosphorus and 2% Lioleic acid. In

Hisex Brown hens, feed was formulated to fulfill the requirements: 2800 Kcal Met. energy, 17.0% Crude protein, 0.43% Methionine, 0.73% Methionine+Cystine, 0.85% Lysine, 3.60% Calcium, 0.42% available Phosphorus and 1.2% Lioleic acid. Lighting schedule was also provided in accordance with the management guide of both hybrids (14 hours light:10 hours dark).

Eggs yield has been assessed daily then laying intensity was calculated (ratio between produced eggs and accommodate flock x 100). Proportion of eggs with normal/abnormal shell was also studied. Flock casualties have been assessed weekly, the cumulated individual mortality and its percentage were also calculated.

The data were collected, input in a database and statistically processed, including for the analysis of variance, in order to test the significance of the differences between the performances of the heat stressed and normal accommodated hens.

RESULTS AND DISCUSSIONS

It was expected to achieve high levels of production throughout the experimental period, in both used hybrids, knowing the husbandry conditions were appropriate to those recommended by the biological material producers. In fact, such commercial hybrids were specially designed for the conventional cage system. Numeric eggs production, expressed as daily mean/group ranged between 449.14 egg and 454.43 eggs in Lohmann layers, while in Hisex layers reached values within the 447.3-451.1 eggs/day range (wk. 25…wk.28). These data, corroborated with flock casualties dynamics allowed the calculation of laying intensity levels. These oscillated between 89.80% (wk 25) and 91.53% (wk. 28) for Lohman hybrid. The other investigated genotype (Hisex Brown) achieved different but close values, between 89.20% and 91.30% laying intensity (table 1, fig. 1).

Table 1 Eggs yield and laying intensity of both analyzed hybrids, throughout the 25-28 weeks fowl age

Fowl age	LB Group (Lohmann Brown hens)			HB group (Hisex Brown hens)		
	Flock size (hens)	Laid eggs (daily average yield)	% laying	Flock size (hens)	Laid eggs (daily average yield)	% laying
week 25	500	449.14	89.80	500	447.3	89.20
week 26	498	450.86	90.56	497	448.1	89.94
week 27	498	453.29	90.96	496	449.9	90.52
week 28	496	454.43	91.53	494	451.1	91.30

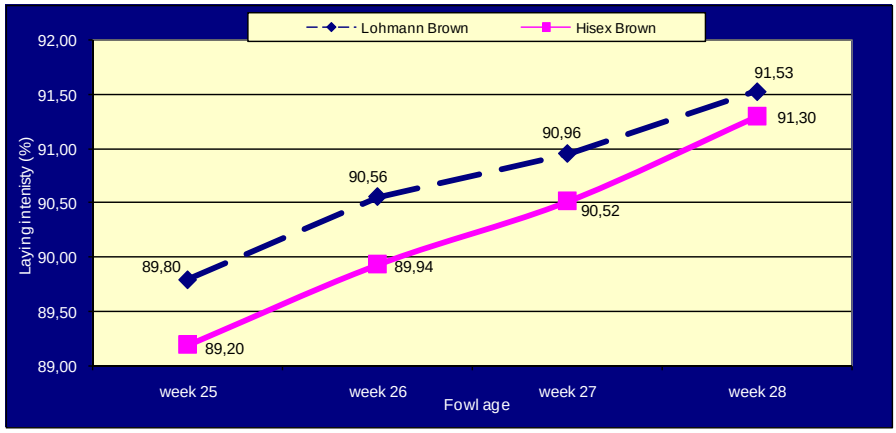

Fig. 1 Dynamics of laying in both hybrids intensity during laying peak period (weeks25-28)

From Fig. 2 it could be observed slight differences between the investigated hybrids. Moreover, performances became close as the hens approached the peak of production. Despite they gave different values of laying, these were very close to the standard recommended performance (92-94% during week 28), proving that such hybrids could adapt well in small scale exploitations. Similar results were reported by other researchers [1], [2].

Adaptability degree of the hens was translated through the achieved mortality degree (table 2). Thus, during the 4 weeks approaching the laying peak, there were cumulated 0.80 % casualties (LB group) or even 1.20% mortalities (HB group), as reported to the initial flock (500 hens/gr.).

Table 2 Mortality (cumulated and relative values) of both analyzed hybrids, during 25-28 weeks age

Fowl age	LB Group (Lohmann Brown hens)			HB Group (Hisex Brown hens)		
	Hens	Individual mortality (cumulated)	Mortality (%)	Hens	Individual mortality (cumulated)	Mortality (%)
week 25	500	0	0	500	0	0
week 26	498	2	0.40	497	3	0.60
week 27	498	2	0.40	496	4	0.80
week 28	496	4	0.80	494	6	1.20

Such casualties levels, reported by table 2, are quite high for just 4 weeks of screening, considering the technological recommendations for total liveability (94-96% for entire laying period or 0.5% mortality throughout 4 weeks) but could be explained by some difficulties in maintaining microclimate factors at top quality levels. It was observed higher sensitivity of HB group. However, temporary raise of mortality could be explained by a lack of adaptability to the inappropriate husbandry conditions, especially when the productive stress becomes higher, due to the approach of the laying peak [6], [10].

Despite the casualties, quantitative eggs production situated at well levels. Quality of production, assessed through the proportion of marketable/unmarketable eggs revealed close results between the studied hybrids (table 3, fig. 2).

Table 3 Ratio between intact shell eggs and faulty shell eggs, under the influence of heat stress

Fowl age	LB Group (Lohmann Brown hens)					HB Group (Hisex Brown hens)				
	Yielded eggs	Shell quality balance				Yielded eggs	Shell quality balance			
		Intact shell	%	Faulty shell	%		Intact shell	%	Faulty shell	%
week 25	3144	3059	97.30	85	2.70	3131	3040	97.09	91	2.91
week 26	3156	3086	97.78	70	2.22	3137	3067	97.77	70	2.23
week 27	3173	3138	98.90	35	1.10	3149	3107	98.67	42	1.33
week 28	3181	3160	99.34	21	0.66	3158	3130	99.11	28	0.89
Mean values:			98.33		1.67			98.16		1.84

ANOVA test: no statistical significant differences were found between analyzed means

Therefore, highest levels of shell fabric failure occurred during week 25 and started to decrease toward week 28, probably due to a better adaptation of the uterus glands to the shell deposition effort. Thus, proportion of eggs with shell defects varied between 2.70% (wk. 25) and 0.66% (wk. 28) in Lohmann Brown hens. Slight similar values were recorded for the other investigated genotype (Hisex Brown), varying form 2.91% (week 25) to 0.89% (week 28). The averages for the entire period reached 98.33% marketable eggs and 1.67% faulty shell eggs in LB group, respectively 98.16% ready for sale eggs and 1.87% faulty shell eggs in HB group.

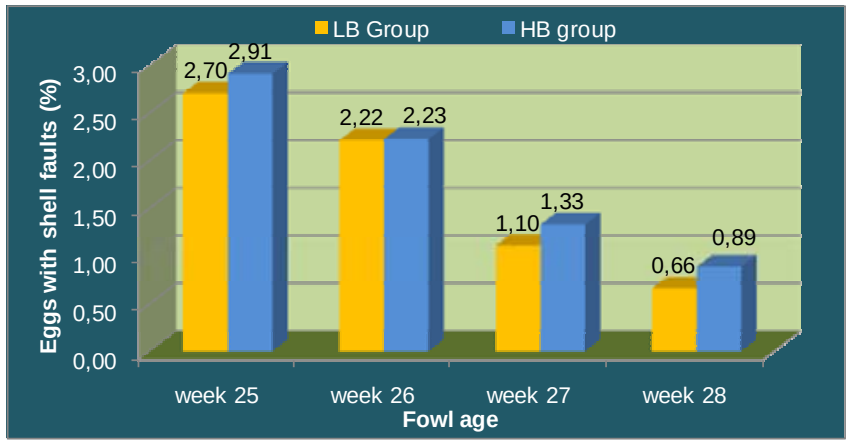

Fig. 2 Proportion of faulty shell eggs from whole eggs yield, as related to hybrid group (LB=LohmannBrown), (HB=HisexBrown)

Despite the differences between the studied genotypes, no statistical differences occurred when the analysis of variance test was performed, suggesting that both hybrids could give good levels of high quality marketable eggs. However, HB group hens adapted better to the providing conditions. Fig. 2 depicts the fact that the proportion of faulty eggs decreased more intense as they approached the laying peak moment. It will be expected for these shell defects to appear and increase again toward the end of laying cycle, due to fowl exhausting and worsening of calcium uptake and usage [4].

Other researches [10] presented values achieved by several layers genotypes reared within hot and humid climate conditions. Other studied focused on the performances of the laying hens in accordance with the husbandry system. All of them [3], [5], stated that best performances were achieved under conventional cage rearing conditions. However, it is a real fact that not all farmers could afford to run investments in cage batteries systems and they could use a mixed system (pens with access toward outer grasslands) [8, 9]. It would be interesting to deepen the researches, in order to test both hybrids for free-range exploitations in the conditions of Kurdistan area, using rearing equipments available on site at small farmers and cheap feed resources, even less animal origin protein concentrated feedstuffs [9].

CONCLUSIONS

Quantitative and qualitative production parameters levels revealed that both hybrids could be used in small farm eggs production, as long as the microclimate and feeding environment is provided at the required levels.

Achieved performances are resumed shortly below:

- laying intensity between 91.30-91.53 % during peak of production;
- mortality levels across 4 weeks: 0.80-1.20%;
- 98.16-98.77% marketable eggs from whole yield and still improving around the peak period.

It would be provoking to assess the response of these hybrids to a free range husbandry system, run in small family farms, under the outdoor climate conditions of Kurdistan area.

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