Scientific Papers. Series D. Animal Science. Vol. LIX, 2016
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

INFLUENCE OF REARING TECHNOLOGY ON FEED CONSUMPTION OF YOUNG BROILER BREEDERS

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Abstract

Study was performed to observe influence of some environmental factors (light intensity and poultry density) and of litter type on feed consumption of young broiler breeder males ROSS 308 during whole raising period (0-18 weeks). Researches are part of a massive experiment analyzing quality of semen material and breeding efficiency of broiler breeding parents. Three experimental procedures were designed (A – with analyze parameters sub-standard and litter made of chopped straws, B – with analyze parameters above standard and litter made of rice hulls and C – with analyze parameters at the level recommended by the manufacturer of biological material and litter made of wood shavings). Registered values of feed consumption were similar to those recommended by the manufacturer of biological material in all three cases (differences were not assured statistically). Comparison of average values of individuals from the three groups has revealed that those values are not significantly different. So variation of environmental factors and litter type do not affect feed consumption.

Key words: *litter, feed intake, rosters, density, light intensity.*

INTRODUCTION

Modern intensive poultry industry is based on well oiled poultry products production, processing and marketing strategies and politics. Intensive poultry production is allowing high and economical efficient productions of high quality hatchable eggs by surface unit. It is performed on litter and in climate controlled houses with performing feeding and watering systems and automatically nests which is offering a higher usage of eggs. (Appleby et al., 1992).

MATERIALS AND METHODS

Researches have been performed during two years on chicks of ROSS 308 hybrid for studying influence of some environmental factors (light intensity, bird density) feed consumption gain of young broiler breeders (Hocking, P. M. and R. Bernard, 1997).
Three trial series have been performed for this purpose:

- experiment procedure A observed influence of some environmental factors (light intensity and poultry density) at sub-standard values and litter made of chopped straws;
- experiment procedure B observed effect of raising environmental parameters beyond standard and using litter made from rice hulls;
- experiment procedure C observed effect of standard light intensity and poultry density and using litter made from wood shavings.
- Works were performed inside three farms with one farm for each experiment procedure: Avicola Călărași, S.C. Agrafood S.A. and Avicola Focșani.

Experiment procedure A was performed based on results from 4100 ROSS 308 male commercial hybrids during rising period (0-18 weeks).
Environmental parameters considered were:

- litter: chopped straws;
- sub-standard light intensity: 7 lux at 1-6 weeks, 20 lux at 6-9 weeks, 7 lux at 10-20 weeks, and 30 lux over 20 de weeks;
- sub-standard poultry density: 3 males/m2;

Experiment procedure B was performed based on results from 6000 ROSS 308 male

commercial hybrids during rising period (0-18 weeks). Environmental parameters considered were:

- litter: rice hulls;
- over standard light intensity: 30 lux at 1-6 weeks, 60 lux at 6-9 weeks, 30 lux at 10-20 weeks, 70 lux over 20 de weeks;
- over standard poultry density: 5 males/m^2;

Experiment procedure C was performed based on results from 4400 d ROSS 308 male commercial hybrids during rising period (0-18 weeks). Environmental parameters considered were:

- litter: wood shavings;
- standard light intensity: 15 lux at 1-6 weeks, 40 lux at 6-9 weeks, 15 lux at 10-20 weeks, 40 lux over 20 weeks;
- standard poultry density: 4 males/m^2;

Poultry were raised in uniform conditions inside the three units (for the three experiment procedures) on litter bed and in up-to-date houses and with feed and water delivered according to technical book of the hybrid (Aviagen, 2005). Poultry used in the three experiment procedures were fed the same way for results to be compatible.

Live weight was the parameter observed during rising period (0-18 weeks).

Classical statistical methods were used for phonotypical identification of groups as following (Sandu, 1995):

- *Student* test to compare evenness of two samples averages;
- *Fisher* test was used for several samples after a variance analyze. Calculated value F was obtained by referring square averages between samples to samples square average;
- χ^2 test was used to verify evenness of an empirical distribution (of observed frequency O_j) with a theoretical distribution (of frequency T_j).

RESULTS AND DISCUSSIONS

To emphasize the possible influence of environmental factors and litter type on feed consumption during raising period, we are showing average values of analyzed parameter for the three experimental procedures and statistical significance of differences observed between average figures. Observations and records were performed weekly during whole raising period (0-18 weeks) (Mtileni et al., 2007).

Values obtained for feed consumption from individuals in experiment procedure A during raising period are presented in Table 1 and graph from Figure 1. We mention that error of average and variability coefficient in for feed consumption were not established as in farm condition recording consumption for each individual is not possible and the issue is also proper to only pure lines in exceptional situations.

Table 1. Average values for feed consumption in the growth period, for first experience series

Week	n	$\bar{X}$ (g/day)	Standard
1	4100	26	26
2	4100	36	36
3	4100	46	44
4	4100	56	54
5	4100	63	61
6	4100	70	66
7	4100	72	67
8	4100	76	70
9	4100	79	72
10	4100	83	75
11	4100	87	77
12	4100	91	79
13	4100	94	81
14	4100	96	84
15	4100	99	86
16	4100	108	95
17	4100	111	98
18	4100	112	101
Differences significance	$\chi^2 = 16.75^{NS}$ $\chi^2_{17;0.05} = 27.59$; $\chi^2_{17;0.01} = 33.41$		

It is noticed that feed consumption values are overlapped or above hybrids standard curve. Noticed differences were tested for statistical significance between average values of analyzed parameter during the 18 weeks and hybrids technical curve and value of test χ^2 (16,75) pointing to some differences without statistical significance between the two provisions.

The issue is having special practical significance for liveweight. These differences non-significant statistically even at a feed consumption higher than standard point that litter type and environmental parameters under normal values does not affect feed intake but are stress factors not allowing birds to obtain planed dayly gains.

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In ROSS 308 hybrids males from experiment procedure B (Table 2, Figure 2), average feed consumption values are very close to hybrid's standard curve which is beneficial for unit' economical efficiency. Noticed differences between average values of the analyzed character during the 18 weeks and hybrid's technical curve were tested for statistical significance and value of test χ^2 (2.38) point that as in procedure A there are differences without statistical significance between effectively registered values and values recommended by hybrid's standard.

Obtained results apparently are sustaining usage of values over standard of environmental parameters and a litter containing rice hulls as weekly live weights higher than standard were obtained with a feed consumption with little difference over those recommended by hybrid's technical book. So increasing technological parameters and usage of rice hulls positively affects and boosts physiological processes contributing to obtaining the average daily gain without being stress factors for poultry at least in experimental conditions.

Table 2. Average values for feed consumption in the growth period, for first experience series

Week	n	$\bar{X}$ (g/day)	Standard
1	6000	26	26
2	6000	36	36
3	6000	44	44
4	6000	54	54
5	6000	63	61
6	6000	66	66
7	6000	74	67
8	6000	74	70
9	6000	76	72
10	6000	78	75
11	6000	80	77
12	6000	81	79
13	6000	84	81
14	6000	85	84
15	6000	87	86
16	6000	90	95
17	6000	93	98
18	6000	95	101
Differences significance	$\chi^2 = 2.38^{NS}$ $\chi^2_{17;0.05} = 27.59$; $\chi^2_{17;0.01} = 33.41$		

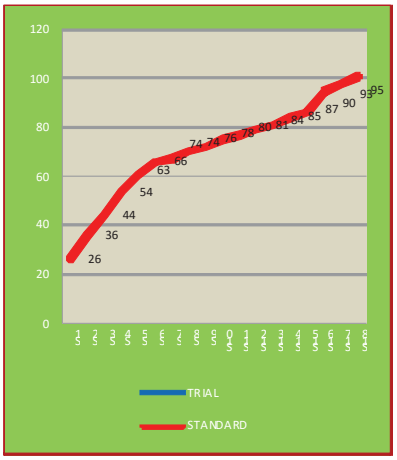

Figure 2. Average values for feed consumption in the growth period, for second experience series

Results obtained in experiment procedure C are shown in Table 3 and Figure 3 and average feed consumption values during the 18 weeks of production period are entirely inside hybrid's standard curve.

Noticed differences between average values of feed consumption during the 18 weeks and hybrid's technical curve were tested for statistical significance and value of χ^2 test (0.11) points that similar to the other experimental procedures there are differences without statistical significance between values

actually registered and those recommended by hybrid's standard.

Results obtained in experiment procedure C and their correlation with results obtained for the live weight are validating the suggestion according to whom sticking to standard environmental technological parameters and usage of a classical wood shavings litter are keeping poultry on the right growth curve with a feed intake similar to that recommended by hybrid's technical book.

Table 3. Average values for feed consumption in the growth period, for third experience series

Week	n	$\bar{X}$ (g/day)	Standard
1	4400	26	26
2	4400	37	36
3	4400	45	44
4	4400	55	54
5	4400	61	61
6	4400	65	66
7	4400	67	67
8	4400	70	70
9	4400	72	72
10	4400	75	75
11	4400	77	77
12	4400	79	79
13	4400	81	81
14	4400	84	84
15	4400	87	86
16	4400	95	95
17	4400	98	98
18	4400	101	101
Differences significance	$\chi^2 = 0.11^{NS}$ $\chi^2_{17;0.05} = 27.59$; $\chi^2_{17;0.01} = 33.41$		

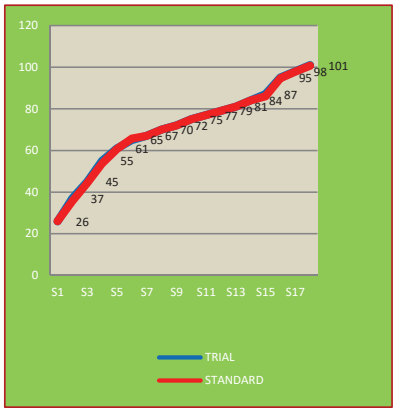

Figure 3. Average values for feed consumption in the growth period, for third experience series

Next would be pointing to and evaluation of differences which are present between average values of feed consumption la males of ROSS 308 hybrid in the 3 experiment procedures and the nature of those differences and testing their statistical significance.

Noticed differences between average values registered in the three experiment procedures for the analyzed character are being shown in Table 4 and Figure 4.

Table 4. Differences between experimental series for feed consumption

Week	Group A $\bar{x} \pm s_{\bar{x}}$ (g)	Group B $\bar{x} \pm s_{\bar{x}}$ (g)	Group C $\bar{x} \pm s_{\bar{x}}$ (g)	Observed differences		
				A-B (g)	A-C (g)	B-C (g)
1	26	26	26	0	0	0
2	36	36	37	0	-1	-1
3	46	44	45	2	1	-1
4	56	54	55	2	1	-1
5	63	63	61	0	2	2
6	70	66	65	4	5	1
7	72	74	67	-2	5	7
8	76	74	70	2	6	4
9	79	76	72	3	7	4
10	83	78	75	5	8	3
11	87	80	77	7	10	3
12	91	81	79	10	12	2
13	94	84	81	10	13	3
14	96	85	84	11	12	1
15	99	87	87	12	12	0
16	108	90	95	18	13	-5
17	111	93	98	18	13	-5
18	112	95	101	17	11	-6
Differences significance	$F=0.60^{NS}$ $F^{51}_{1;0.05} = 19.50$; $F^{51}_{1;0.01} = 99.50$; $F^{51}_{1;0.001} = 999.50$					

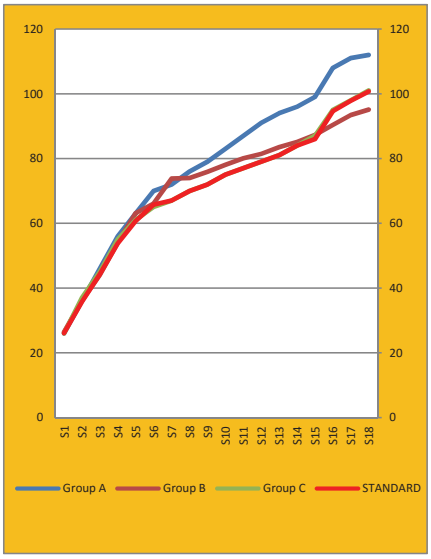

Figure 4. Differences between experimental series for feed consumption

Calculated values of Student test are higher than the presumed values which are revealing the existence of some differences with a high degree of statistical significance between average values of feed consumption for all the 3 experiment procedures. This result is supportive to the hypothesis according to which the variation of environmental parameters and of litter type is having an effect only on growth curve with no effect on feed consumption. Feed consumption is staying unchanged and very close to feed consumption recommended by hybrid's technical book with small individual variations but without statistical significance.

CONCLUSIONS

1. In ROSS 308 hybrids males cluster from grouping A average feed consumption values are being overlapping or are above standard hybrid's curve with differences with no statistical significance.
2. In ROSS 308 hybrids males cluster from grouping B average feed consumption values are being very close to curba standard hybrid's curve which is beneficial for economical efficiency of the unit (differences with no statistical significance).
3. In ROSS 308 hybrids males cluster from grouping C average feed consumption values during the 18 weeks of the rearing period are being entirely on standard hybrid's curve.
4. Calculated value of Fisher test is being smaller than critical (tabular) value which is revealing the existence of some differences with no statistical significance between average feed consumption values for all the 3 experiment procedures. This result is supportive to the hypothesis according to which the variation of environmental parameters and of litter type is having no effect on feed consumption.

REFERENCES

Appleby M.C., B.O. Huges, H.A. Elson, 1992. Poultry Production Systems: Behavior, Management and Welfare. CAB International, Wallingford,Oxon, UK.

Aviagen, 2005. Environmental Management in the broiler breeder laying house.

Hocking P.M., R. Bernard, 1997. Effects of male body weight, strain and dietary protein content on fertility and musculo-skeletal disease in naturally mated broiler breeder males. Br. Poultry Science 38:29-37.

Mtileni B.J., Nephawe K.A., Nesamvuni A.E., Benyi K., 2007. The influence of stocking density on body weight, egg weight, and feed intake of adult broiler breeder hens. Poultry Science, 86(8):1615-1619.

Sandu Gh., 1995. Modele experimentale în zootehnie, Ed. Coral Sanivet.