

RELATIONSHIP BETWEEN CAGE AREA AND YIELD OF THE MAIN ELEMENTS OF CHICKEN CARCASSES

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Key words: broiler chickens, live weight, proportion of breast, carcass value

The aim of the research paper was to monitor and evaluate the effect of different cage area on live weight and carcass parameters of hybrid combination Ross 308 cocks and hens in 35 days feeding period. The experiment was performed in experimental practice of Department of Poultry Science and Small Animal Husbandry of Slovak Agricultural University. Broiler chickens were kept in a three-deck cage system. Every cage had breadth 4320 cm² (90 cm length, 48 cm width and 40 cm depth). One day chickens were randomly divided into three groups: The control group with 0.036 m² of provided area for one chicken, the 1st experimental group with 0.0432 m² of provided area for one chicken and the 2nd experimental group with 0.054 m² of provided area for one chicken. The live weight of broiler chickens has been weighted in weekly periods at 1, 7, 14, 21, 28 and 35 days of age. Carcass parameters (share of breast from carcass, share of thighs from carcass and carcass value) have been specified in 6 chickens (nearly average live weight) from each group after the end of the experiment.

At the end of the feeding period at the age of 35 days we noticed the similar tendency in live weight in cocks as well as in hens. We found out the highest average live weight in the 2nd experimental group with 0.054 m² of provided area for one chicken (1677.67 g in cocks and 1540.42 g in hens) and the lowest average live weight in the control group with 0.036 m² of provided area for one chicken (1488.83 g in cocks and 1402.25 g in hens). In carcass parameters of cocks we found out the highest average values of share of breast from carcass (28.38%) and carcass value (74.48%) in the control group with 0.036 m² of provided area for one chicken and the lowest average values of these parameters in the 2nd experimental group with 0.054 m² of provided area for one chicken. Only in the share of thighs from carcass we found out the same tendency as in the live weight. We observed the highest average values of share of breast from carcass (30.95%) in hens in the 2nd experimental group with 0.054 m² of provided area for one chicken and share of thighs from carcass (33.62%) in hens in the 1st experimental group with 0.0432 m² of provided area for one chicken and carcass value (74.64%) in hens in the control group with 0.036 m² of provided area for one chicken.

INTRODUCTION

Over the past 3 decades, the poultry industry has had tremendous growth all over the world. For many years, there have been strict rules for keeping farm animals and animal welfare groups have expressed their dislike for the ways in which broilers are being kept and grown to slaughter weight. At present, there is no Community legislation on the subject of keeping and breeding poultry kept for meat production. The European Commission published the first in a series of minimum standards on broiler welfare on May 31st 2005. The legislation sets out a maximum stocking density of 30 kg/m² of broiler chickens across the EU, including appropriate access to litter, drinkers feed and ventilation [2005]. Although a maximum stocking density of 30 kg of live broilers will be a rule, farms will be allowed to stock up to 38 kg of broiler chickens per square meter if they provide additional welfare resources and if inspections at the slaughter stage continue to prove that the animals have not suffered any problems [Van der Sluis, 2005a]. The stocking density can be exceeded if other conditions (water and feed supply, ventilation, temperature, noise, suitable light regime, light intensity, regular inspection) will be

observed [Pritchard, 2005]. The long term effect of high temperature is one of the reasons of feather pecking and in some case also cannibalism [Chmelničná, 2002]. Thomas *et al.* [2004] experimented with five different stocking densities of broiler chickens and found out, that during the study, the chickens grew faster at lower stocking densities. At the end of the feeding period at the age of 35 days, they observed, that stocking density had no influence on the feed/weight gain, mortality or carcass characteristics. According to Dawkins *et al.* [2004] differences in the environment for chickens have more impact on welfare than has stocking density itself. Air humidity, litter humidity and ammonia level are very important and affect the health condition of animals [Van der Sluis, 2005b]. In connection with the European Commission proposal about decrease of maximum stocking density of live broilers per square meter on littered floor, it can be supposed, that farmers will reflect upon possibility of using cage technologies in broiler feeder. With optimal ventilation technique it is able to reach more intensive utilization of rearing space as well as a little shortening of feeding period. So it is actual again to define optimal stocking density of cages for currently used broiler hybrids.

MATERIALS AND METHODS

The aim of the research paper was to monitor and evaluate the effect of different cage area on live weight and carcass parameters of hybrid combination Ross 308 cocks and hens in 35 days feeding period.

The experiment was performed in experimental practice of Department of Poultry Science and Small Animal Husbandry of Slovak Agricultural University. Broiler chickens were kept in a three-deck cage system. Every cage had breadth 4320 cm² (90 cm length, 48 cm width and 40 cm depth). The drinking was provided by nipple drinkers. Every cage was equipped with trough feeders and daily filled by hand.

One day chickens were randomly divided into three groups: the control group with 0.036 m² of provided area for one chicken, (3 cages with 12 chickens, total 36 chickens); the 1st experimental group with 0.0432 m² of provided area for one chicken (3 cages with 10 chickens, total 30 chickens); and the 2nd experimental group with 0.054 m² of provided area for one chicken (3 cages with 8 chickens, total 24 chickens).

We monitored the following parameters: (a) live weight – weighted in weekly periods at 7, 14, 21, 28 and 35 days of age; and (b) carcass parameters-specified in 6 chickens (near average live weight) from each group after the end of experiment: share of thighs from carcass (%), share of breast from carcass (%), and carcass value (%).

RESULTS AND DISCUSSION

At the end of the feeding period at the age of 35 days we noticed the similar tendency in live weight in cocks as well

as in hens (Table 1). We found out the highest average live weight in the 2nd experimental group with 0.054 m² of provided area for one chicken (1677.67 g in cocks and 1540.42 g in hens) and the lowest average live weight in the control group with 0.036 m² of provided area for one chicken (1488.83 g in cocks and 1402.25 g in hens). We observed that both cocks and hens reached higher average live weight at lower stocking densities, which do not correspond with findings of Thomas *et al.* [2004].

In carcass parameters of cocks we found out the highest average share of breast from carcass (28.38%) in the control group with 0.036 m² of provided area for one chicken and the lowest average value of this parameter in the 2nd experimental group with 0.054 m² of provided area for one chicken. In the share of thighs from carcass we found out the same tendency as in the live weight (Table 2). We observed the highest average values of share of breast from carcass (30.95%) in hens in the 2nd experimental group with 0.054 m² of provided area for one chicken and share of thighs from carcass (33.62%) in hens in the 1st experimental group with 0.0432 m² of provided area for one chicken (Table 3). According to Table 4, we found out the highest average carcass value of cocks (74.48%) in the control group with 0.036 m² of provided area for one chicken and the lowest average value of this parameter in the 2nd experimental group with 0.054 m² of provided area for one chicken. The highest average carcass value of hens (74.64%) was also found out in the control group with 0.036 m² of provided area for one chicken and the lowest average value of this parameter in the 1st experimental group with 0.0432 m² of provided area for one chicken. We found out no statistically significant differences in these parameters.

TABLE 1. Average live weight of cocks and hens at the end of the feeding period.

Group	Cocks			Hens		
	\bar{x}	SD	v	\bar{x}	SD	v
Control group	1488.83	158.88	10.67	1402.25	185.66	13.24
The 1 st experimental group	1522.42	264.16	17.35	1411.58	186.27	13.20
The 2 nd experimental group	1677.67	202.86	12.09	1540.42	263.86	17.13

TABLE 2. Share (%) of breast and thigh in relation to weight of carcasses of cocks at the end of the feeding period.

Group	Share of breasts from carcass (%)			Share of thighs from carcass (%)		
	\bar{x}	SD	v	\bar{x}	SD	v
Control group	28.38	0.59	2.09	32.72	1.00	3.04
The 1 st experimental group	28.22	0.15	0.52	33.60	2.06	6.12
The 2 nd experimental group	28.00	1.08	3.86	34.52	0.65	1.89

TABLE 3. Share (%) of breast and thigh in relation to weight of carcasses of hens at the end of the feeding period.

Group	Share of breasts from carcass (%)			Share of thighs from carcass (%)		
	\bar{x}	SD	v	\bar{x}	SD	v
Control group	28.26	2.61	9.22	33.39	1.38	4.15
The 1 st experimental group	28.90	0.65	2.23	33.62	1.85	5.50
The 2 nd experimental group	30.95	0.78	2.53	32.47	1.98	6.10

TABLE 4. Yield (%) of carcasses from cocks and hens at the end of the feeding period.

Group	Cocks (%)			Hens (%)		
	\bar{x}	SD	v	\bar{x}	SD	v
Control group	74.48	74.48	74.48	74.64	1.10	1.47
The 1 st experimental group	72.99	72.99	72.99	72.11	1.35	1.88
The 2 nd experimental group	72.85	72.85	72.85	74.00	1.76	2.38

CONCLUSION

In experimental monitoring of the effect of different cage area on live weight and carcass parameters of hybrid combination Ross 308 cocks and hens in 35 days feeding period, we observed, that both cocks and hens reached higher average live weight at lower stocking density at the end of the feeding period at the age of 35 days.

We found out no statistically significant differences in share of breast, share of thighs from carcass and carcass value neither in cocks nor hens between groups, but higher values of these parameters were reached at higher stocking densities.

REFERENCES

1. Dawkins M.S., Donnelly C.A., Jones T.A., Chicken welfare is influenced more by housing conditions than by stocking density. *Nature*, 2004, 427.342-344.
2. Chmelničná L., The effect of high temperatures in intensive poultry raising, 2002. *Vnútroňná klíma poľnohospodárskych objektov*, 2002. Nitra, pp. 28-31 (in Slovak).
3. Pritchard D. Broilers: New European commission proposals for a Council Directive on the welfare of meat chicken. *Worlds` Poultry Sci. J.*, 2005, 61, 633-646.
4. Thomas D.G., Ravindran V., Thomas D.V., Camden B.J., Cottam Y.H., Morel P.CH., Cook C.J., Influence of stocking density on the performance, carcass characteristics and selected welfare indicators of broiler chickens. *New Zeal. Vet. J.*, 2004, 52, 76-81.
5. Van der Sluis W., EU farmers to upgrade broiler welfare standards. *World Poultry*, 2005a, 21, 7, 37.
6. Van der Sluis W., Housing conditions affect broiler welfare more than stocking density. *World Poultry*, 2005 b, 21, 8, 22-23.
7. Proposal for a Council Directive laying down minimum rules for the protection of chickens kept for meat production, 2005. Available on internet: [<http://www.europarl.europa.eu/oeil/Find-ByProcnum.do?lang=2&procnum=CNS/2005/0099>].