

Utilization of laying-type cockerels as poussins

- Growth performance and carcass quality

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Abbreviated title: Utilization of laying-type cockerels

Summary

The aim of the study is the development of a new conventional and ethically justifiable production system for the rearing of male layer chicks to produce poussins. The purpose is to find an alternative to the present culling of one-day-old male layer chicks (2007 in Germany: over 42 Million). In the course of several rearing periods, economic efficiency, suitable management factors, and carcass product quality were to be evaluated. The experiment was performed on commercial broilers (Ross 308) and different genotypes of laying-type cockerels: medium heavy, brown-eggshell Lohmann Brown (LB) and Hy-Line Brown; light, white-eggshell Lohmann Selected Leghorn (LSL) and Dekalb White). The cockerels were reared on deep litter, and were fed standard diets *ad libitum*. The first step was to find out the appropriate genotype by analyzing fattening performance and carcass quality.

The broilers attained the intended carcass weight of about 650 g after 19 days, the laying-type cockerels after 47 days (LB, Hy-Line) or 49 days (LSL, Dekalb), respectively. According to growth performance, there was a continuous increase until day 42, whereas LB and Hy-Line as a trend performed better than LSL and Dekalb. Feed conversion was calculated to be 1:1.2 for broilers, and 1:2.5 for egg-laying types. Consequently, a considerable improvement can be

expected by modifying and optimizing the feeding method. The valuable parts (i.e. breast, legs) were on average 284 g for broilers and 262 g for laying-type cockerels, with meat contents of 197 g (Ross), 175 g (LB, Hy-Line, LSL) and 166 g (Dekalb).

Forthcoming investigations will complement the characterization of the carcass quality of laying-type cockerels, and the expected results on meat quality will contribute to the decision of which laying-type cockerels are appropriate as poussins.

Keywords: laying-type cockerel, poussin, growth performance, carcass quality, valuable parts, tissue distribution

Introduction

This project refers to the announcement of a directive about advancement of innovations to improve livestock breeding (German Federal Ministry of Food, Agriculture and Consumer Protection). The aim of the study is the development of ethically justifiable methods within the scope of reproduction of laying hens. The purpose is to find an alternative to the present culling of one-day-old male laying-type chicks (in 2007 in Germany: over 42 Million). There are but few studies about fattening of laying-type cockerels (JAENECKE, 1996; MURAWSKA *et al.*, 2005) which point out a low economic efficiency because of a long fattening period, a high feed conversion rate, and a disadvantageous meat distribution in carcasses. As a different approach, our study investigates the utilization of laying-type cockerels as so-called poussins. The EC marketing standard for poultry meat defines a poussin as an animal with less than 650 g carcass weight [VO (EG) Nr. 543/2008]. The production of poussins implies a far shorter fattening period and a lower feed conversion rate, and therefore an improvement of economic efficiency. In order to evaluate both the expected economic efficiency and the product quality, we studied as a first step the growth performance and the carcass quality of laying-type cockerels. The results of the project may help to link the production of a high quality product with the solution of ethical problems in animal production.

Materials and methods

The entire study is divided into three trials, the first of which is presented here. The purpose of this first trial was to find an appropriate laying-type genotype. To this end, growth performance, carcass quality, meat quality, and economic efficiency were evaluated. In a second trial, slaughtering time and feeding will be optimized. In a final step, a commercial production will be established, and genetical aspects will be studied.

The experiment comprised different genotypes of laying-type cockerels as well as male and female commercial broilers as control (namely, Ross 308). On the one hand, the medium heavy, brown eggshell genotypes Lohmann Brown (LB) and Hy-Line Brown were selected; on the other hand, the light, white eggshell Lohmann Selected Leghorn (LSL) and Dekalb White.

The animals were kept in deep litter and reared in different pens of 10 m², with 100 chicks per pen. Overall, 400 animals were available per genotype. The lighting program was constant light for the first 72 h, and from the fourth day an alternating of 8 h of light and 4 h of darkness. In order to determine growth performance, the target body weight was defined to be 650 g. The birds' weight was measured on the first day and then weekly on day 7, 14, 21, 28, 35, 42 and 47/49. In addition, feed and water uptake were recorded. The animals were fed standard diets *ad libitum*: starter (up to seven days of age, broilers and male layer-types), grower (from 2nd to 4th week, male layer-types only) and finisher (day 8 to 18 : broilers, day 29 to 46/48: male layer-types).

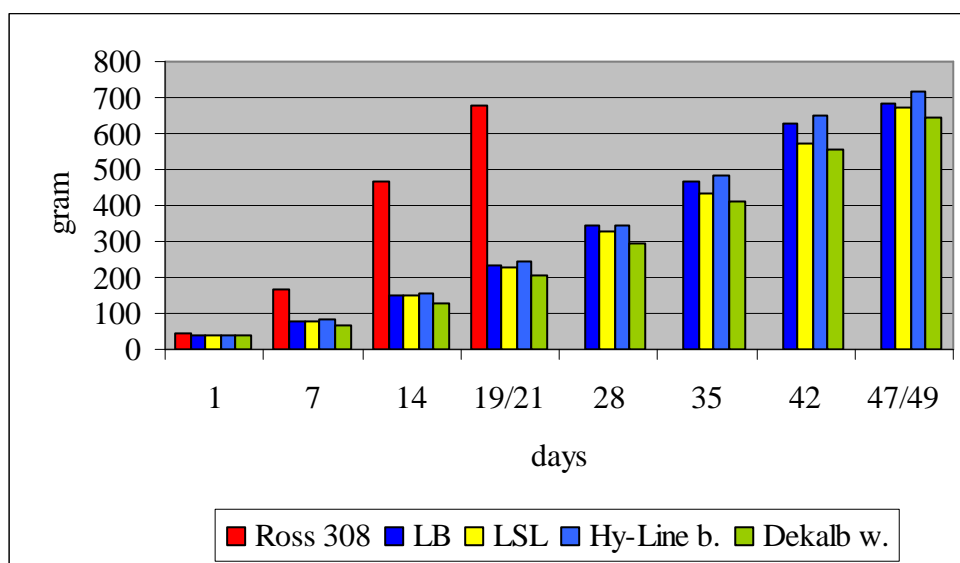
As carcass traits we determined carcass weight, the weights of the separate cuts (breast, back, wings, legs, abdominal fat) and tissue distribution (meat, fat, skin, tendons and bone). Differences between groups were tested with the non-parametric Kruskal-Wallis-Test.

In the following representative results for fattening performance and carcass quality will be presented.

Results and discussion

The fattening period to achieve the target body weight of about 650 g averages 19 days (Ross 308), 47 days (LB and Hy-Line) and 49 days (LSL and Dekalb) (Figure 1).

Figure 1: Fattening period (days) of broiler breed and different laying-type cockerels to achieve target body weight of about 650 g



The laying-type cockerels continuously increased in growth rate up to day 42, with somewhat higher rates for medium-heavy LB and Hy-Line than for light LSL and Dekalb (Figure 2).

A continuous increase of the growth rate for five weeks and its following decrease are usual for the fattening performance of broilers (JAENECKE, 1996).

The feed conversion rate averaged 1:2.3 for LB and Hy-Line Brown, 1:2.7 for LSL and Dekalb, and 1:1.2 for Ross (Figure 3).

Figure 2: Growth rate (g/week) of different laying-type cockerels

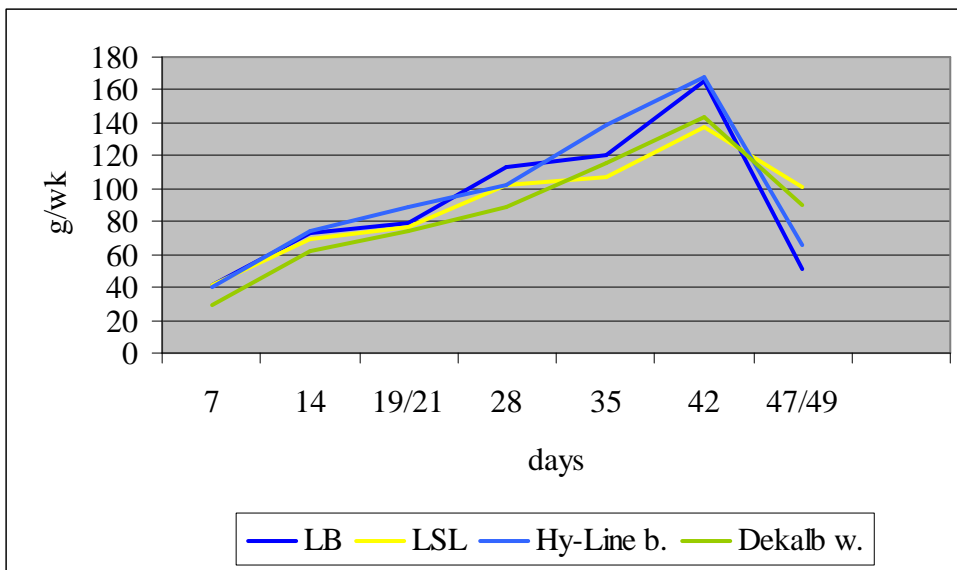
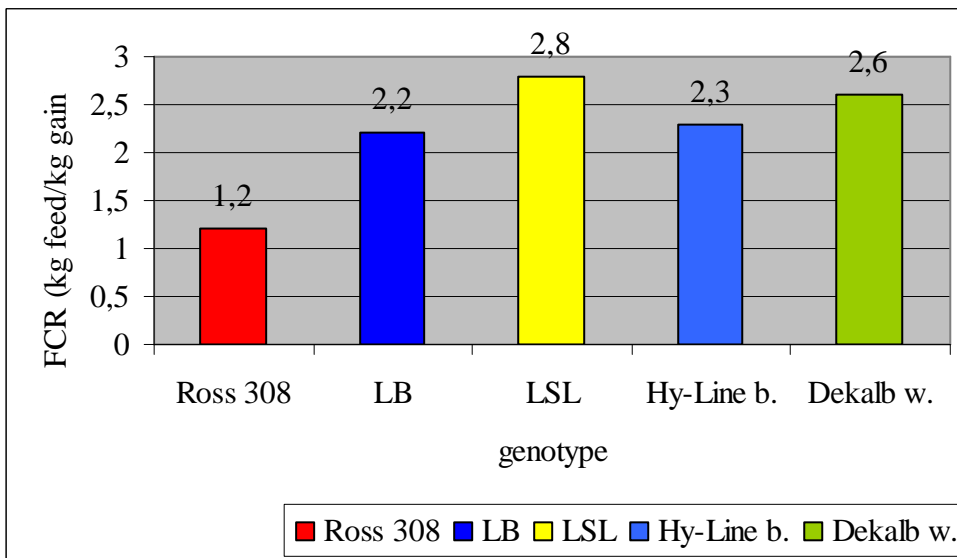


Figure 3: Feed conversion (kg feed/kg gain) of broiler breed and different laying-type cockerels



The feed conversion varied extensively during the fattening period. An optimized feeding method could improve the present results. For example, modified feeders would decrease feed wastage and could thus considerably improve feed conversion rate.

Total carcass weights amounted to 445 g for Ross and about 430 g for the laying-type cockerels. Table 1 compares the weights of the various cuts.

Table 1: Comparison of cuts (percentage of carcass weight) and weight of cuts (g) of broiler breed and different laying-type cockerels

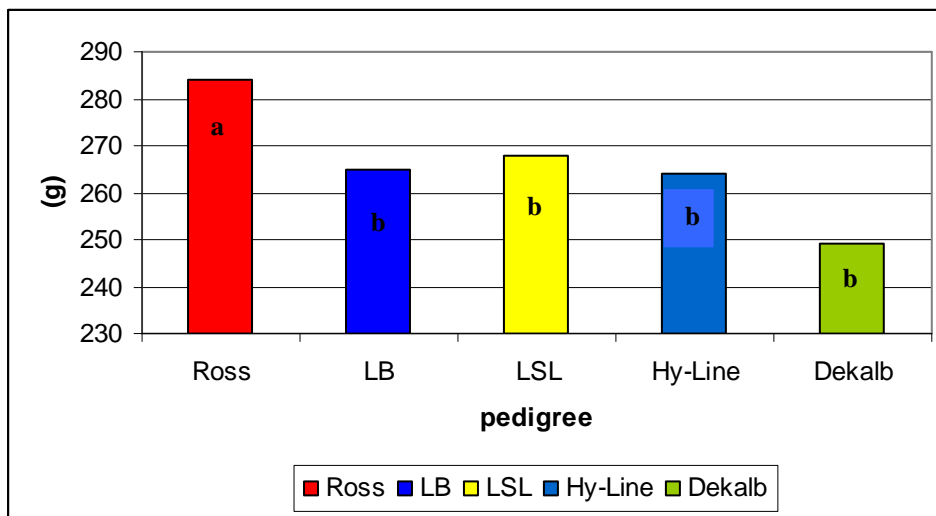
Genotype	breast	thigh	drumstick	wings	back	abdominal fat
Ross 308	34 ^a (148 g)	18 ^c (77 g)	13 ^c (59 g)	11 ^c (47 g)	22 ^b (95 g)	1.7 ^a (7 g)
LB	25 ^c (109 g)	19 ^{ab} (83 g)	17 ^a (73 g)	15 ^a (64 g)	22 ^b (95 g)	0.3 ^d (1 g)
Hy-Line	26 ^c (111 g)	20 ^a (86 g)	16 ^a (72 g)	15 ^{ab} (63 g)	23 ^a (99 g)	0.4 ^{bd} (2 g)
LSL	27 ^b (116 g)	19 ^b (81 g)	15 ^b (67 g)	14 ^b (60 g)	23 ^a (98 g)	0.6 ^b (3 g)
Dekalb	27 ^b (109 g)	19 ^b (76 g)	15 ^b (64 g)	14 ^b (57 g)	23 ^b (91 g)	0.6 ^{bd} (2 g)

Means in columns not sharing a letter differ significantly (Kruskal-Wallis-Test $p < 0,05$)

Breast cuts were significantly different between Ross, brown eggshell LB/Hy-Line, and white eggshell LSL/Dekalb. At this, light-laying-type cockerels performed better than medium heavy ones. The thigh weight was significantly different between Ross and all laying-type cockerels. Among laying-types, differences were indicated but just not significant between LB/Hy-Line and LSL/Dekalb. As a tendency, medium heavy lines performed better than light lines. The drumstick weight was significantly different between Ross, LB/Hy-Line and LSL/Dekalb. In this case, medium-heavy laying-type cockerels performed better.

The total weight of the valuable parts breast, thigh and drumstick were not significantly different between laying-type cockerels (Figure 4). With regard to tissue distribution, the meat content was 197 g for Ross, about 175 g for LB, Hy-Line, and LSL, and 166 g for Dekalb. Meat content was not significantly different between laying-type genotypes.

Figure 4: Average weight of valuable parts (g) of broiler breed and different laying-type cockerels
Means in columns not sharing a letter differ significantly (Kruskal-Wallis-Test $p < 0,05$)



The present results of fattening performance and carcass traits indicate that no laying-type is to be preferred for the utilization of cockerels as poussins. Forthcoming results on meat quality may contribute to an appropriate choice between laying-type genotypes.

References

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