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MUSCOVY AND COMMON DUCK: EFFECT OF SYSTEM OF BREEDING ON SLAUGHTERING TRAITS AND MEAT QUALITY

Marzoni M., Paci G., Bagliacca M.

Department of Anatomical, Physiological and Animal
Production Science - Pisa University.
56100 PISA - ITALY

ABSTRACT

Since meat quality is actually of great importance in Europe and open air breeding systems are preferred by the consumers, the authors evaluated the slaughtering traits of Muscovy and common ducks bred under different techniques (breeding period: whole inside a poultry house or finisher period at open air). Results showed that the system which presumes a finisher period at open air really determines differences in carcass traits and meat quality of both the studied ducks. However, the carcasses of the Muscovy ducks showed better traits than the carcasses of the common ducks, independently from the breeding technology adopted.

INTRODUCTION

Muscovy duck (MD) is characterized by high meat quality according to the meaning of quality given by the consumers of most of the Developed Countries (Countries located in the temperate and hot zones, where meat quality means meats characterized by low fat content). On the contrary, common ducks (CD) of Pekin or other breeds, are generally preferred in Northern and in Developing Countries where the energy content of meat is of fundamental importance and the high fat content does not represent a demerit. Both ducks can be bred by intensive breeding or by systems which provide a breeding period at open air similarly to the system already scheduled in France to accord the registered trademark "Label Rouge" and considered as a satisfactory breeding technology to obtain a quality label in the Countries bearing to the European Economical Community (3).

For these reason it is interesting to compare the characteristics of the carcasses of MD and CD obtained from birds bred for the whole breeding period in a windowless poultry house (INT) with the carcasses of the same ducks bred at open air during the last period of growth (LAB). The goal of this studies is to determine the existence of objective relationships between the quality of the carcasses and the breeding technology.

MATERIALS AND METHODS

Six hundreds duck females (300 CD and 300 MD) were used for the trial. All the birds were bred from first day of life to 28 days old inside a windowless poultry house (day light: 23L:1D, density: 10 ducks/m²). At the age of 29 days (May, 28, 1991) the birds of each species were assigned to two groups: one half MD and CD were continued to be bred inside the poultry house (INT) and one half MD and CD were transferred to open air pens (LAB), the second group of ducks was bred at open air similarly to the France breeding system which assigns the "label rouge". Twelve pens at open air and 12 pens inside the poultry house were used (pens density = 5 ducks/m²). Crumble feed was used from one day to 42 days, pellet feed was used from 43 days to slaughtering age. All birds fed the same feed used in our previous experiments (1).

A sample of duck (10 birds for each group) was slaughtered starting from 6 to 11 weeks of age. After weighing (LW), the ducks were electrically stunned (200 V per 5") then bled and

dryplucked. The ducks were immediately dissected and the following traits were weighed: dryplucked and bled carcass, neck and head, legs, giblets, gizzard, liver, ready to cook carcass (RCC), abdominal fat (FAT), skin with subcutaneous fat (SKIN) and breast muscles (BM). BM were divided into two sub-samples. On the first sub-sample, the cut strength (CUT) and the dry matter (DM) were determined within one hour by Warner-Bratzler equipment (4) and by dry-freezer, respectively. The crude protein (PROT), the ether extract (EE) and the total collagen (COL) were determined on the second deep-freeze sub-sample (2).

Slaughtering traits and meat characteristics were analyzed according to the following models: **Slaughtering trait**_{ijkl} = $\mu + \text{COV}_{x_{ijkl}} + \text{BS}_i + \text{SP}_j + \text{BS} \cdot \text{SP}_{ij} + \text{PEN}_k + \varepsilon_{ijkl}$

Meat characteristic_{ijkl} = $\mu + \text{BS}_i + \text{SP}_j + \text{BS} \cdot \text{SP}_{ij} + \text{PEN}_k + \varepsilon_{ijkl}$

where: **COV** = LW for RCC, **COV** = RCC for SKIN, FAT or BM; **BS** = breeding system, **SP** = species, **PEN** = pen.

RESULTS AND DISCUSSION

Slaughtering traits (estimated means, expressed as percentages on LW or RCC) are reported in table 1 and meat characteristics are shown in table 2.

Table n. 1 Slaughtering traits

parameter	age	MD		CD		MD	CD	INT	LAB
		INT	LAB	INT	LAB				
LW(g)	7	1782	1783	1581	1700	1783	> 1641	1682	1742
	8	1870	< 2005	1768	< 2030	1938	1899	1819	< 2018
	9	2114	2042	1681	< 2049	2078	> 1865	1898	< 2046
	10	2124	2050	1904	2062	2087	> 1983	2014	2056
	11	2094	2160	1922	< 2124	2127	> 2023	2008	< 2142
RCC	7	56.1	< 60.4	54.5	< 58.9	58.3	56.7	55.3	59.6
	8	57.4	61.0	58.4	58.7	59.2	58.5	57.9	59.8
	9	61.0	62.2	56.6	57.3	61.6	> 56.9	58.8	59.7
	10	62.9	62.7	57.4	59.0	62.8	> 58.2	60.2	60.9
	11	64.6	63.6	58.8	57.5	64.1	> 58.2	61.7	60.6
SKIN	7	20.9	22.8	25.7	27.5	21.9	< 26.6	23.3	25.2
	8	22.1	21.5	22.9	24.9	21.8	23.9	22.5	23.2
	9	21.2	18.6	19.0	22.5	19.9	20.7	20.1	20.5
	10	18.9	19.5	22.8	22.2	19.2	< 22.5	20.9	20.9
	11	18.2	17.9	23.2	21.6	18.1	< 22.4	20.7	19.7
FAT	7	1.4	2.0	1.5	1.3	1.7	1.4	1.4	1.6
	8	2.6	2.4	1.3	2.2	2.5	1.7	1.9	2.3
	9	2.5	2.8	1.1	1.8	2.7	> 1.4	1.8	2.3
	10	2.8	2.0	2.0	2.0	2.4	2.0	2.4	2.0
	11	2.1	2.2	1.3	2.1	2.1	1.7	1.7	2.2
BM	7	9.4	9.9	14.2	13.2	9.7	< 13.7	11.8	11.5
	8	15.1	14.4	16.8	18.1	14.7	< 17.4	15.9	16.2
	9	18.1	> 16.4	18.2	19.3	17.3	18.8	18.2	17.9
	10	19.2	19.2	19.4	18.9	19.2	19.2	19.3	19.1
	11	21.7	22.0	18.9	19.4	21.8	> 19.2	20.3	20.7

Note: "<" or ">" between columns means avgs which differ per P<.05.

Regarding the slaughtering traits, in addition to the already observed LW differences (1), only differences between CD and MD can be observed. Regarding the meat characteristics, in addition to the well known differences related to the species (5), some differences can be observed in relationship to the system of breeding. CUT and COL seems to be higher in INT than in LAB and significative differences are reached at 7-9 and 8 weeks old for CUT and for COL, respectively. Our results show objective differences related to the employment of the only different breeding technology with no change of bird density or feed composition. It is known that

Table n. 2 Some chemical and physical characteristics of the breast muscle

parameter	age	MD		CD		MD	CD	INT	LAB
		INT	LAB	INT	LAB				
DM	7	22.9	23.3	24.6	24.4	23.1	< 24.5	23.7	23.9
(% on)	8	23.9	23.6	26.0	24.4	23.7	< 25.2	24.9	24.0
(a.f.b.)	9	23.7	23.1	25.1	24.9	23.4	< 25.0	24.4	24.0
	10	25.0	24.6	26.0	25.9	24.8	26.0	25.5	25.3
	11	25.7	24.7	26.0	26.7	25.2	26.4	25.9	25.7
PROT	7	18.9	18.6	19.6	19.6	18.7	19.6	19.2	19.1
(% on)	8	18.7	18.8	20.5	19.6	18.7	< 20.1	19.6	19.2
(a.f.b.)	9	19.6	19.9	21.1	20.4	19.8	20.7	20.4	20.1
	10	20.2	20.7	22.1	22.0	20.4	< 22.0	21.1	21.3
	11	21.3	20.7	22.6	22.6	21.0	< 22.6	21.9	21.7
EE	7	2.6	2.0	2.7	2.0	2.3	2.3	2.7	2.0
(% on)	8	2.5	2.7	2.6	2.9	2.6	2.7	2.5	2.8
(a.f.b.)	9	1.6	1.3	1.5	1.6	1.4	1.5	1.5	1.4
	10	1.5	1.3	1.7	1.6	1.4	1.7	1.6	1.5
	11	2.2	2.1	1.7	2.3	2.1	2.0	1.9	2.2
ASH	7	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
(% on)	8	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.2
(a.f.b.)	9	1.3	1.6	1.3	1.3	1.5	1.3	1.3	1.4
	10	1.4	1.3	1.4	1.4	1.3	1.4	1.4	1.3
	11	1.4	1.3	1.4	1.4	1.3	1.4	1.4	1.3
CUT	7	2.6	2.3	2.0	1.7	2.4	> 1.6	2.3	> 1.9
(Kg/cm ²)	8	2.6	2.5	2.0	> 1.5	2.5	> 1.7	2.3	2.0
	9	2.3	2.0	2.0	> 1.4	2.6	1.8	2.2	> 1.7
	10	2.5	2.4	1.7	1.6	2.6	> 1.6	2.1	2.0
	11	2.6	2.0	1.7	1.9	2.3	> 1.8	2.1	2.0
COL	8	6.5	> 3.7	4.6	2.7	5.1	> 3.7	5.6	> 3.2
(mg/g)	9	4.9	4.0	4.1	3.2	4.4	3.6	4.5	3.6
(a.f.b.)	10	4.4	4.1	4.0	3.2	4.2	3.6	4.2	3.6
	11	4.2	4.1	3.5	3.4	4.1	3.4	3.8	3.7

Note: "<" or ">" between columns means avgs which differ per P<.05.

CUT and COL are positively related to the hardness of the meat and, even if the trend of our differences go against the common opinion which links INT technology with soft meat, our results seem to indicate that the adoption of LAB technology produces meat less hard than the INT technology. However, the tendency to lower values of COL in LAB might be explained by the stimulated growth which LAB induces in the ducks bred at open air during the favourable seasons

CONCLUSIONS

The employment of the only open air breeding technique for the finisher period, generally requested by consumers and between the rules scheduled for the obtaining of meat quality labels, really determines changing of the meat characteristics of the ducks.

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