

WORKSHOP ON QUALITY AND STANDARDIZATION OF THE WATER FOWL PRODUCTS

PAWŁOWICE (Poland)

MAY 10 - 13, 1993

PROCEEDINGS

Paci G., Marzoni M., Bagliacca M., Fedeli Avanzi C.:
PERFORMANCE AND MEAT QUALITY OF ITALIAN MULARD BRED UNDER
DIFFERENT TECHNOLOGIES 73

PERFORMANCE AND MEAT QUALITY OF ITALIAN MULARD BRED UNDER DIFFERENT TECHNOLOGIES

Paci G, Marzoni M, Bagliacca M., Fedeli Avanzi C.

*Department of Anatomical, Physiological and Animal Production Science V.le delle
Piazze, 2 - 56100 Pisa, Italy*

INTRODUCTION

In Italy the poultry industry is founded on the intensive breeding but a new tendency is rising: the semi-intensive system, which consists in the open air breeding the last period of growth.

It is well known that the breeding system is one of the ante-mortem factors which affects meat quality. In France the semi-intensive breeding is the principal condition to obtain the registered trademark "Label Rouge" (1).

Consumers are greatly interested in quality and animal welfare. Buildings and equipment must maintain good conditions of hygiene, avoid behavioural disorders and traumatic injuries so to obtain the best carcass characteristics (10).

Duck breeding is widely used in several countries to produce meat. Two different species of duck are commonly used for meat production: Muscovy duck - mainly in France and Italy - and Common duck - mainly North Europe and South East-Asia (2, 4, 11).

In Italy the consume of duck meat is not widespread for three main reasons: the expensive price, the particular taste of the meat and the common opinion that the carcasses have an high content of fat, even if Muscovy duck are less fat than Common ducks and the fat content of muscles is low in both ducks.

Our previous experiments, carried out with Muscovy and Common duck during favourable seasons, showed positive results in relationship to the semi-intensive system of breeding (5, 6, 7, 8). The aim of the present study was to investigate the effect of the breeding system on the growing performances, the carcass traits and the meat quality of the mulards, the mule duck obtained by crossing Muscovy drakes with Common ducks.

MATERIALS AND METHODS

240 mulards (local Muscovy drake x local Common duck) were used for the trial, carried out during the favourable seasons, were bred in six different pens inside a windowless poultry house from one to 28 days old (day light: 23L:1D). The Mulards were bred at the density of 10 birds/m². At 39 days old the ducks were divided into two groups: one half ("intensive ducks") continued to be bred inside the poultry house (day light: 10L:14D) and the other half ("open air ducks") were transferred to open air pens; six pens inside the poultry house and six pens at open air. The density every pen was 5 mulards/m².

Ducks fed ad libitum two commercial diets (3). Crumble feed given from one to 42 days old (M.E. = 12.01 MJ/Kg, crude protein = 18.05%, crude fibre = 4.27%) and pellet feed from 43 days old to slaughtering age (M.E. = 12.50 MJ/Kg, crude protein = 16.43%, crude = 3.99%).

Individual live weight and feed consumption per pen were recorded weekly.

A sample of mulards (12 bird from each group) was slaughtered weekly starting from 7 till 11 weeks of age. The live weights (LW) of ducks were measured immediately before

slaughtering. Than the ducks were electrically stunned (200 V for 5), bled and dry plucked. The mulards were immediately dissected and the following traits were weighed: dry plucked and bled carcass, neck with head, legs, giblets, gizzard, liver, ready to cook carcass (RCC), abdominal fat (FAT), skin with subcutaneous fat (SKIN) and breast muscles (BM). The left breast muscle was cold boned and used to test shear force (SHEAR) by Warner-Bratzler equipment.

Chemical composition of breast muscles was determined according to the A.O.A.C. methods of analysis: crude protein (PROT) and ether extract (EE) on deep-freeze samples, dry matter (DM) and ashes (ASH) on fresh samples.

Data were analysed according to the following models:

$$\text{Live weight}_{ijk} = \mu + \text{BS}_i + \text{PEN}_j + \epsilon_{ijk}$$

$$\text{Feed Conversion Efficiency}_{ijk} = \mu + \text{BS}_i + \epsilon_{ijk}$$

$$\text{Slaughtering trait}_{ijk} = \mu + \text{COV}_{x_{ijk}} + \text{BS}_i + \text{PEN}_j + \epsilon_{ijk}$$

$$\text{Breast Muscles Characteristic}_{ijk} = \mu + \text{BS}_i + \text{PEN}_j + \epsilon_{ijk}$$

where:

μ - overall mean;

BS - breeding system;

PEN - pen;

cov - LW for RCC and RCC for SKIN, FAT or BM;

ϵ - residual error

RESULT AND DISCUSSION

Daily growth rate (estimated means and variation coefficient) of birds bred under the two different breeding system are shown in table 1.

During the first week at open air the ducks showed a better growth than the "intensive duck": the daily weight gain was 49.6 g/d vs. 42.9 g/d, $P < 0.05$. After the first week at open air the growth rate of semi-intensive ducks decreased but (27.4 g/d and 42.9 g/d, for 7-8 and 8-9 weeks of age in "open air duck", vs. 16.5 g/d and 22.5 g/d, for 7-8 and 8-9 weeks of age in "intensive duck" $P < 0.05$). After the 10th week of age daily growth became very small and feed efficiency becomes very high in both groups.

Figure 1 shows the live weight trends of the "intensive and open air animals". Ducks bred at open air always showed higher live weights than the other group of ducks.

Feed intake was stimulated by open air breeding but feed conversion was only slightly worsened with no significant differences (1-70d.: open air duck 4.0 and intensive duck 3.7).

Slaughtering traits, (Table 2) did not showed significant differences between the birds bred under the two breeding technologies, although a tendency to better traits was observed in the "open air ducks".

Ready to cook carcass increased progressively till the 11th week of age ("intensive ducks" 63.3% and "open air ducks" 64.1%) but already reached good values at the 10th week of age ("intensive ducks" 62.3% and "open air ducks" 63.3%).

Breast muscles were characterised by late growth as observed in Muscovy ducks and showed considerable growth only starting from the 8th week of age. The average rate of

breast muscles on RCC was 23.5 % at the 10th week of age.

The skin with subcutaneous fat and the abdominal fat showed a typical trend with age: the highest values were observed between 7-8 weeks and the lowest values between 10-11 weeks. The limited proportion of the skin with subcutaneous fat and the abdominal fat in the Italian mulard must be pointed. The skin proportion of Italian mulards, at the 9th week of age, was 19.2-19.9 % while the average skin proportion of the Mulard produced in Germany was 23.6-26.0 % (9).

No differences in the chemical composition and physical characteristic of the breast meat (Table 3) were observed between the two breeding system. On account of the reduced possible to test shear force; in fact the sample of meat used for this test had to be 11 mm diameter (with no connective tissue).

CONCLUSION

Our results confirm the possibility of using the mulard in the semi-intensive system of breeding with good results. The favourable environmental conditions and the good hygiene, with characterise generally open-air breeding, seem to improve the potencial of the heterosis resulting in a better growth rate and meat proportion in the mulards bred at open air.

The mulard, obtained by crossing Italian strains of Muscovy ducks with Common ducks, is characterised by lighter weight of the carcass compared with the male parent and by limited incidence of the skin with subcutaneous fat on the carcass in respect to the female parents.

This product could meet the new requirements and wishes of the consumers since does not determine increases of the productive costs for the limited construction and equipment that the open air breeding system need.

REFERENCES

1. AA.VV., (1990) - Dossier Label. L'Aviculteur 513:29-46.
2. AA. VV., (1991) - Section 5: Country profiles. In the Watt poultry yearbook: international edition. Poultry International (30),8:46-62.
3. Bagliacca M., Mori B., Paci G., Marzoni M., Fedeli Avanzi C., (1990) - Effect of small quantities of proteolizates or synthesized aminoacids in duckling feed. Proc.VIII European Poultry Conference, Barcelona (Spain):320-322.
4. Skrabka-Blotnicka T., (1992) - Processing ducks and geese in Poland. Poultry International (31), 13: 62-66.
5. Marzoti M., Paci G., Bagliacca M., (1992) - Muscovy and Common ducks: effect of system of breeding on slaughtering traits and meat quality. Proc.IX Internat.Symposium ob Waterfowl, Pisa (Italy):240-242.
6. Marzoni M., Paci G., Berni P., Fedeli Avanzi C., Bagliacca M., (1992) - Qualita delle carni di maschi di anatra comune e muschiata in rapporto all'eta ed alla diversa tecnica di allevamento. Proc. XLVI Congress S.I.S.Vet., S.Giuliano - Venezia (Italy), in press.
7. Paci G., Bagliacca M., Fedeli Avanzi C., (1992) - Performance produttive di maschi di anatra comune e muschiata in rapporto alla diversa tecnologia di allevamento. Proc.XLVI Congress S.I.S.Vet., S.Giuliano- Venezia (Italy), in press.
8. Paci G., Marzoni M., Bagliacca M., Fedeli Avanzi C., (1992) - Muscovy and Common duck: effect of system of breeding on performance. Proc.IX Internat. Symposium on Waterfowl, Pisa (Italy):99-101.

9. Pingel H., (1989) - Combining the qualities of muscovy and pekin ducks. Poultry Misset (4), 7:11-13.
10. Pingel H., Schneider K-H., Klemm R., Knust U., (1992) - Recent problems of breeding and production of waterfowl with high carcass and meat quality. Proc. IX Internat. Symposium on Waterfowl, Pisa (Italy):17-32.
11. Sauveur B., de Carville H., (1990) - Le Canard de Barbarie. I.N.R.A., Paris.

Table 1

Average daily growth (Estimated means) of mulards bred intensively
(starter and finisher periods in poultry house)
or at open air (starting 29 d.)

Daily growth	Breeding system					
	INTENSIVE					
d.	mulards n.	avg. g	V.C. %			
0-7	240	11.5		10.7		
8-14	240	33.4		11.8		
15-21	240	48.0		12.0		
22-28	240	50.7		9.0		
	INTENSIVE			OPEN AIR		
	mulards n.	avg. g	V.C. %	mulards n.	avg. g	V.C. %
29-35	120	42.9 ^b	11.3	120	49.6 ^a	11.3
36-42	120	53.5 ^a	10.7	120	41.2 ^b	11.4
43-49	108	35.1	11.7	108	35.1	11.2
50-56	96	16.5 ^b	11.1	96	27.4 ^a	11.2
57-63	84	22.5 ^b	11.8	84	42.9 ^a	9.6
64-70	72	32.5 ^a	11.8	72	21.9 ^b	9.5

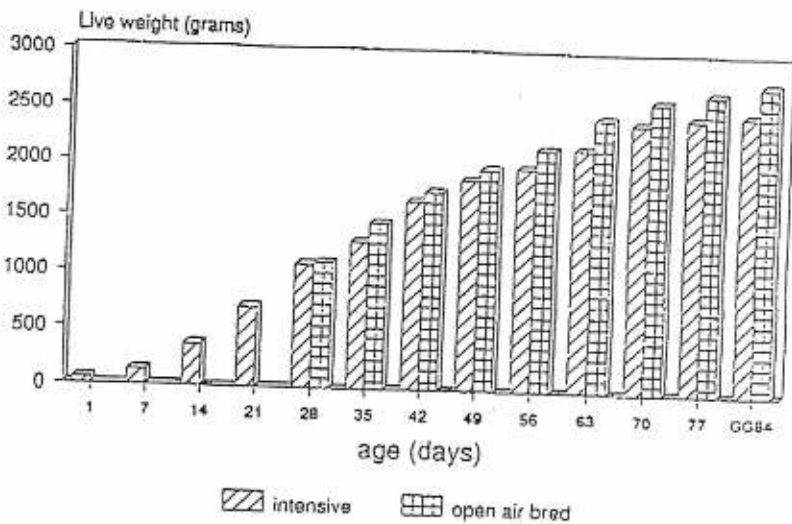
Note: means within a row with different superscripts are significantly different ($P \leq 0.05$)

Table 2

Slaughtering traits of mulardes at different ages (estimated means, expressed as percentages on LW or RCC)

Parameter	Age	Breeding system	
		INTENSIVE	OPEN AIR
LIVE (g) WEIGHT	7	1900	2000
	8	2080	2273
	9	2260	2480
	10	2450	2554
	11	2573	2730
READY (%) COOK CARCASS	7	56.9	56.7
	8	57.3	57.5
	9	59.7	61.0
	10	62.3	63.3
	11	63.3	64.1
BREAST (%) MUSCLES	7	9.9	8.5
	8	10.9	11.2
	9	15.1	16.3
	10	23.2	24.2
	11	24.1	24.5
FAT (%)	7	1.5	1.1
	8	1.7	1.9
	9	1.6	1.8
	10	0.6	0.9
	11	0.9	0.5

Figure 1
Trend of growth



THE ORGANIZING COMMITTEE OF THE WORKSHOP

Chairman: Prof. Dr. Sc. Stanisław Wężyk
Secretary: Dr. Eng. Katarzyna Cywa-Benko
Members: Dr. Eng. Andrzej Rosiński
M. Sci. Eng. Eugeniusz Węccek
Miss Bogusława Krawiec

*The publication of "Proceedings" supports The Committee
of Scientific Research;
Grant No: 5 0050 91 01 and 5 54 03 92 03*

*THE PAPERS IN ENGLISH ARE PUBLISHED
ON AUTHOR'S RESPONSIBILITIES*