COMPARISON OF TEN COMMERCIAL STRAINS OF TERMINAL BUCKS : II. CARCASS TRAITS

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Abstract - Carcass traits for broilers from 10 commercial buck strains are described. Young rabbits were slaughtered at 8 or 11 or 14 weeks. Carcass traits were investigated on a sample of 1638 rabbits. Data were analysed separately for each slaughter age. Batch of slaughter and buck strain have a significant effect on a lot of traits. At 14 weeks and in relation to the residual standard deviation, buck strain have a medium effect on perirenal fat percentage (ratio between 2 and 3), and a light effect on dressing percentage and meat/bone ratio.

INTRODUCTION

Strains of commercial bucks are crossed with crossbred does to produce young rabbits which are slaughtered at the weight of 2350g in France (ROCHAMBEAU, 1994). This weight remains constant since a lot of year. As their is a genetic progress on post weaning growth rate (ROCHAMBEAU et al, 1994), the slaughter age decreases steadily. Consequently, qualities of the carcass and of the meat could change.
Carcass traits are well documented but the great part of the results deal with pure breed and not with commercial strains of terminal bucks. This paper provides a description of the carcass composition of young rabbits from ten commercial strains.

MATERIAL AND METHODS

Breeding of the bucks

Bucks from 10 commercial strains were introduced just after their birth one experimental farm (Station Expérimentale Lapin et Palmipèdes, INRA Toulouse). Breeding companies had send between 20 and 23 bucks per strain and they were adopted by lactating does.
Afterwards, bucks were despatched in another experimental farm (Le Magneraud, INRA Poitou Charentes). At 18 weeks old, they are trained to produce semen. One buck is collected each week. A sample of 11 bucks is chosen from all the bucks of one strain on the basis of semen production.

Breeding of the does

180 does were introduced in Le Magneraud experimental farm just after weaning. They were born in SELAP experimental farm. We crossed a A2066 buck with a A1077 doe to produce these 0067 females. This genotype is used by a lot of French rabbit breeders (ROCHAMBEAU, 1994).
Rabbits are reared in an isolated building, heated and dynamically ventilated. Bucks and does are lighted 16 hours per day. Each breading rabbit have and individual wire cage. Broiler rabbits are raised in another building. All rabbits were fed ad libitum with the same commercial pellet.
Each three weeks one half of the does are inseminated. Semen of bucks of three strains are blended and utilised on one third of the does. In total, 14 series of insemination were made between September 1994 and June 1995.

Breeding of the broilers

About 550 young rabbits were weaned, weighted and tattooed at 35 days of age. They are bred in collective wire cages of six rabbits. At 8 weeks of age, 39 does (13 per strain) are slaughtered. At 11 weeks of age, 39 does (13 per strain) are slaughtered and 39 other does are translated in individual wire cages to be slaughtered at 14 weeks of age. All the remaining broilers were sell at 11 weeks of age. In total 16 batches of slaughter were made between December 1994 and November 1995.

Batches of slaughter

Study of carcass was made according to the recommendations of BLASCO *et al.* (1992) during the former World Rabbit Congress.
Various measurements were taken before and after slaughtering: live weight (LW), commercial skin weight (CSW), gastrointestinal tract weight (GW), hot carcass weight (HCW), cold carcass weight (CoCW), commercial carcass weight (CCW), length (LL), liver weight (LW), kidney weight (KW), thymus, trachea, oesophagus, lung and heart weight (LHW), head weight (HW), perirenal fat weight ( ), scapular fat weight (SFW), fore part weight (FPW), intermediate part (IPW), hind part weight (HPW), fresh hind leg weight (FHLW), cooked hind leg weight (CHLW), hind leg bone weight (HLBW).
There after various criteria were computed: dressing percentage (DP = CCW / LW), commercial skin percentage (CSP = CSW / LW), gastrointestinal tract percentage (GP = GW / LW), drip loss percentage (DLP = (HCW - CoCW) / HCW), head percentage (HP = HW / CCW), kidney percentage (KP = KW / CCW), lung and heart percentage (LHP = LHW / CCW), liver percentage (LP = LW / CCW), reference carcass weight (RCW = CCW - LW - LHW - KW - HW), compacity (CO = RCW / LL), perirenal fat percentage (PFP = PFW / RCW), scapular fat percentage (SFP = SFW / RCW), fore part percentage (FPP = FPW / RCW), intermediate part percentage (IPP = IPW / RCW), hind part percentage (HPP = HPW / RCW), meat/bone ration (MBR = FHLW - HLBW) / HLBW),hind leg cooking loss (HLCL = FHLW - CHLW) / FHLW).

Analysis model

The influence of different factors on the traits was measured by fixed effect variance analysis. For slaughter traits they are two fixed effects within age at slaughter: batch of slaughter and bucks strain. Data was analysed within age at slaughter (8, 11 and 14 weeks). R^2 is the proportion of the total variance explained by the model. Data were computed with the soft ware SAS on an IBM 3090 from the "Centre de Traitement de l'Information de la Génétique (CTIG, INRA).

RESULTS

Carcass traits

Batch of slaughter and buck strain have a significant effect on all the traits except on lung and heart percentage at 11 weeks, hind leg cooking loss at every age, and meat/bone ratio at 8 weeks(Table 1). For these 5 traits the buck strain have no significant effect at 1%. Dressing percentage increases from 8 to 14 weeks. In the same time, commercial skin percentage levels off and gastrointestinal tract percentage goes down regularly. Margin between the first and the last strain for dressing percentage is around one standard deviation (Figure 1).

Composition of the carcass varies deeply with the age at slaughter (Table 2). Fat percentages, meat/bone ratio accelerate; compacity, fore part percentage, hind part percentage fall slightly. At 14 weeks, variability between breeds is greater for perirenal fat percentage (2.2 residual standard deviation) than for meat/bone ratio (around 1 residual standard deviation)(Figure 1).

Benefits for the breeding companies

Technicians of the 5 breeding companies have participated to 16 batches of slaughter; as a consequence they know quite well how to divide a carcass and to measure the carcass traits. They can use these traits as a criteria of selection if necessary. In another connection this joint action of various breeding companies give at each participant a great amount of information on its buck strains. The results will be very useful to analyse the selection objective of each strain and to choose the selection criteria (post weaning growth rate, feed efficiency, dressing percentage, fat percentage, meat/bone ratio).

Table 1 : Analysis of variance for carcass traits (1)

Variables		N	LW	DP	CSP	GP	DLP	CCW	HP	LP	LHP	KP
8 WEEKS	Mean	546	1769	0,532	0,145	0,204	0,00553	946	0,0917	0,0716	0,0259	0,0142
	R^2		0,37	0,25	0,23	0,23	0,72	0,36	0,24	0,24	0,12	0,23
	Residual s.d.		166	0,020	0,009	0,021	0,008	108	0,0065	0,010	0,0036	0,0012
	Strain		**	**	**	**	**	**	**	**	**	**
	Batch		**	**	**	**	**	**	**	**	**	**
11 WEEKS	Mean	546	2504	0,568	0,146	0,181	0,049	1422	0,080	0,0539	0,0212	0,0113
	R^2		0,48	0,19	0,27	0,19	0,68	0,44	0,23	0,22	0,10	0,35
	Residual s.d.		201	0,014	0,009	0,014	0,006	134	0,006	0,0076	0,0028	0,0010
	Strain		**	**	**	**	**	**	**	**	**	**
	Batch		**	**	**	**	**	**	**	**	**	**
14 WEEKS	Mean	546	3285	0,571	0,160	0,167	0,0441	1878	0,0722	0,0563	0,0192	0,0104
	R^2		0,49	0,26	0,34	0,15	0,65	0,50	0,17	0,15	0,21	0,28
	Residual s.d.		273	0,015	0,009	0,013	0,0063	171	0,0056	0,0085	0,0023	0,0011
	Strain		**	**	**	**	**	**	**	**	**	**
	Batch		**	**	**	**	**	**	**	**	**	**

N: Number of rabbits
LW : Live Weight
DP : Dressing Percentage
CSP : Commercial Skin Percentage
KP : Kidney Percentage
GP : Gastro intestinal track Percentage
DLP : Drip loss Percentage
CCW : Commercial Carcass weight
HP : Head Percentage
LP : Liver Percentage
** : Effect significant at 1 % level
NS : Non significant
CHP : Lung and Heart Percentage

Figure 1: Variability of strains for some traits (GR: growth rate, FCR: feed conversion ratio, DP: dressing percentage, PFP: perirenal fat percentage, MBR: meat/bone ratio), The unit is the residual standard deviation,

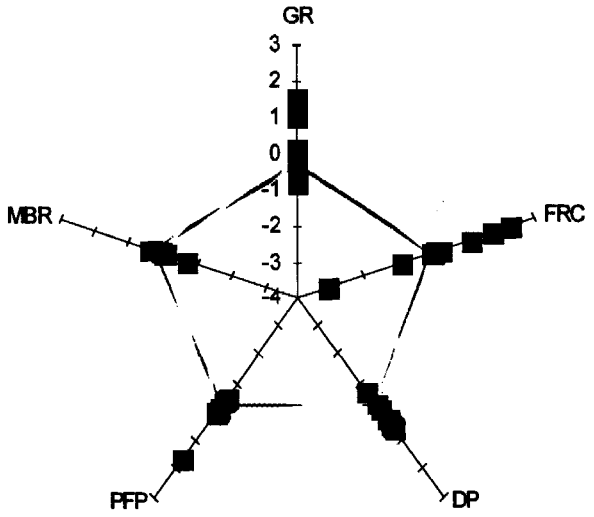

Table 2 : Analysis of variance for carcass traits (2)

	Variables	N	RCW	CO	PFP	SFP	FPP	IPP	HPP	LL	HLCL	MBR
8 WEEKS	Mean	546	754	0,424	0,0163	0,00674	0,287	0,301	0,383	316	0,285	5,42
	R^2		0,34	0,34	0,33	0,17	0,15	0,10	0,15	0,29	0,32	0,18
	Residual s.d		96	0,042	0,0045	0,0020	0,0089	0,010	0,012	11	0,014	0,48
	Strain		**	**	**	**	**	**	**	**	NS	NS
	Batch		**	**	**	**	**	**	**	**	**	**
11 WEEKS	Mean	546	1185	0,305	0,0257	0,00792	0,276	0,313	0,373	358	0,289	6,53
	R^2		0,44	0,38	0,35	0,20	0,15	0,13	0,24	0,43	0,24	0,25
	Residual s.d		119	0,025	0,0085	0,0026	0,0090	0,010	0,011	12	0,016	0,49
	Strain		**	**	**	**	**	**	**	**	NS	**
	Batch		**	**	**	**	**	**	**	**	**	**
14 WEEKS	Mean	546	1580	0,247	0,039	0,0101	0,271	0,0317	0,357	384	0,285	7,35
	R^2		0,46	0,32	0,36	0,21	0,14	0,10	0,29	0,41	0,33	0,28
	Residual s.d		155	0,025	0,011	0,0027	0,009	0,011	0,013	11	0,015	0,59
	Strain		**	**	**	**	**	**	**	**	NS	**
	Batch		**	**	**	**	**	**	**	**	**	**

N: Number of rabbits - **SFP** :Scapular Fat Percentage **L** : Length
RCW : Reference Carcass Weight **FPP** : Fore Part Percentage **HLCL** : Hind Leg Cooking Loss
CO : Compacity **IPP** : Intermediate Part Percentage **MBR** : Meat/Bone Ratio
PFP : Perirenal Fat Percentage **HPP** : Hind Part Percentage * * : Significant at 1 % level **NS** :Non significant

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Comparaison de 10 lignées commerciales de mâles terminaux : caractéristiques des carcasses - On compare les caractères de carcasses de lapereaux issus de 10 souches commerciales de croisement terminal. Les lapereaux ont été abattus à 8, 11 et 14 semaines. Un échantillon de 1638 lapins a été disséqué pour déterminer les composantes de la qualité bouchère. On analyse les données séparément pour chaque âge. Le chantier d'abattage et le génotype du père ont un effet très significatif sur la plupart des variables étudiées. A âge de 14 semaines et par rapport à l'écart type résiduel, le génotype du père a un effet modéré sur le taux de gras périrenal (rapport compris entre 2 et 3), et faible sur le rendement à l'abattage et le rapport muscle sur os (rapport inférieur à 1,5)