COMPARISON OF TEN COMMERCIAL STRAINS OF TERMINAL BUCKS : I. GROWTH AND FEED EFFICIENCY

ROCHAMBEAU H. DE[1], OUHAYOUN J.[2], CAVAILLE D.[3], LACOSTE J.L.[4], J. LERICHE J.L.[5], PONCEAU J.[6], RETAILLEAU B.[7]

[1] INRA, Station d'Amélioration Génétique des Animaux, BP 27, 31326 Castanet Tolosan, France.
[2] INRA, Station de Recherches Cunicoles, BP 27, 31326 Castanet Tolosan, France.
[3] Groupe Coopératif Occitan, BP 40, 11400 Castelnaudary, France
[4] Auvergne Lapin, 15600 Quezac, France
[5] GAEC Cunicole, 59159 Ribecourt Latour, France
[6] Cunifrance, 37390 Epeigné sur Dème, France
[7] Grimaud Frères, 49450 Roussay, France

Abstract - Growth and feed efficiency for broilers from 10 commercial buck strains are described. Young rabbits were slaughtered at 8, 11 or 14 weeks. 8570 broilers were weighted and tested for food efficiency. Data were analysed separately for each slaughter age. Serie of weaning and buck strain have a significant effect on all the investigated traits. At 14 weeks and in relation to the residual standard deviation, buck strain have a notable effect on food conversion ratio (ratio greater than 5) and a medium effect on growth rate.

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 there 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.
Growth of the rabbit between birth and slaughter is 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 growth, the food consumption and the feed efficiency 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 on experimental farm (Station Expérimentale Lapin et Palmipèdes, INRA Toulouse). Breeding companies had sent between 20 and 23 bucks per strain and they were adopted by lactating does. They were weighted and weaned at 4 weeks.
Afterwards, bucks were despatched in another experimental farm (Le Magneraud, INRA Poitou-Charentes). They were weighted each 3 weeks till the age of 8 weeks. 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 has 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. Quantity of feed distributed at each cage is weighted. 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 sold at 11 weeks of age. The remaining feed were weighted for each cage. In total 16 batches of slaughter were made between December 1994 and November 1995. Table 1 indicates the number of broilers of each buck's strain and each serie which were weighted at each batch. To prevent an unlikely mortality a greater number of rabbits were weighted at 8 and 14 weeks that the number plainly necessary for slaughter.

Table 1 : Number of broilers of each serie weighted at each batch by buck's strains

Buck's strains			Batches															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SERIES	1	1	18	147	17													
		3	18	173	18													
		4	18	179	18													
	2	5		18	215	18												
		6		18	213	18												
		7		18	266	18												
	3	8			18	196	18											
		9			18	190	18											
		10			18	172	18											
	4	2				18	162	18										
		3				18	161	18										
		8				18	128	18										
	5	4					18	169	18									
		6					18	110	17									
		9					18	176	18									
	6	1						18	118	18								
		7						18	138	18								
		10						18	136	18								
	7	2							18	126	16							
		4							18	99	18							
		5							18	127	18							
	8	3								17	198	18						
		6								18	199	18						
		9								18	164	18						
	9	1									18	185	18					
		2									18	164	18					
		9									18	154	18					
	10	1										18	171	18				
		5										18	117	18				
		8										17	150	17				
	11	3											18	161	18			
		7											18	171	18			
		9											18	166	18			
	12	4												18	210	18		
		5												18	223	18		
		10												18	209	15		
	13	2													18	159	18	
		6													18	143	18	
		8													18	161	18	
	14	2														18	156	18
		4														18	180	18
		7														18	226	18

Analysis model

The influence of different factors on the traits was measured by fixed effect variance analysis. They are two fixed effects for the growth traits: serie of weaning and bucks strain. Data was analysed within age at slaughter

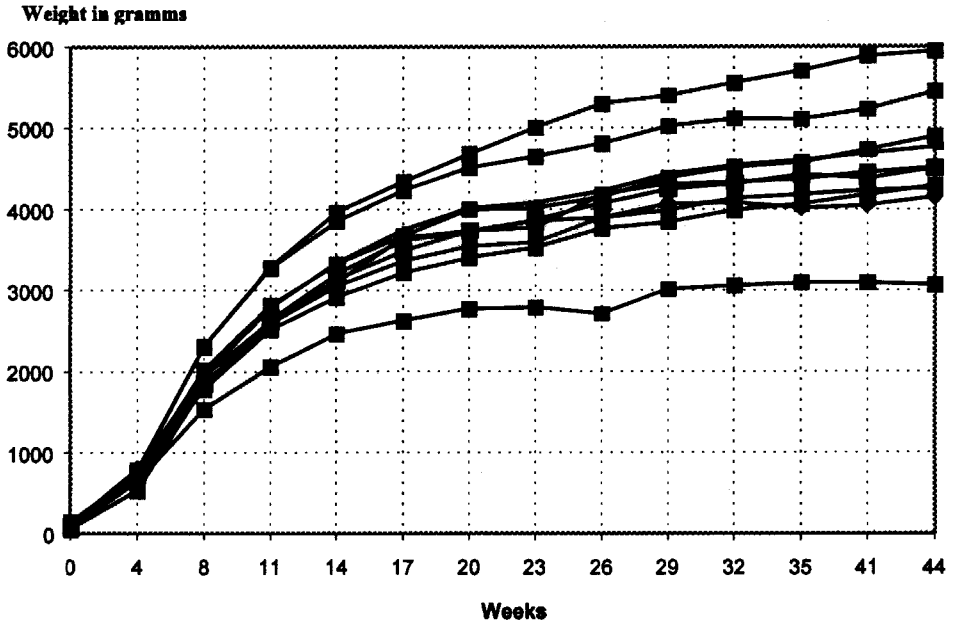
(8, 11 and 14 weeks). R^2 is the proportion of the total variance explained by the model. Data were computed with the software SAS on an IBM 3090 from the "Centre de Traitement de l'Information de la Génétique" (CTIG, INRA).

RESULTS

Growth of the bucks from the ten strains.

Figure 1 gives the mean weight of the bucks of each strain from birth to the age of 44 weeks. At 8 weeks, live weight is between 1547 and 2311 g. At 14 weeks, 2 breeds reach 4000 g. Later, it appears that two strains have a mature body weight greater than 5000g, eight are greater than 4000g and the last one is around 3000g. This mature body weight is not the reference body weight defined by BLASCO *et al.* (1992) because it continue to rise slowly. Nevertheless, this sample of buck's strain present a noticeable variability on mature body weight.

Figure 1: Mean weight of the bucks of each strain



Average daily gain decreases from 8 to 11 weeks, whereas it remains steady at 14 weeks. (Table 3).To explain this strange result, it must be noticed that the sample is smaller (the mean individual weight at weaning are not different), and that the young rabbits were reared in individual wire cages after 11 weeks. The two fixed effects are significant. Figure 2 highlights the variability that exists between the breed on average daily gain from 5 to 14 weeks. Margin between first and last strain is greater than two residual standards deviation.

Table 2 : Analysis of variance for variables describing growth of broilers (grams)

Slaughter age	8 weeks				11 weeks				14 weeks			
Variables	N	WW	LW	ADG	N	WW	LW	ADG	N	WW	LW	ADG
Mean	754	918	1761	40,3	7068	914	2478	37,3	748	920	3278	37,5
R^2		0,21	0,37	0,45		0,20	0,45	0,51		0,21	0,48	0,53
Residual s.d.		105	161	4,7		105	204	3,6		112	276	3,5
Strain		**	**	**		**	**	**		**	**	**
Serie		**	**	**		**	**	**		**	**	**

N : Number of rabbits ; WW : Weaning weight ; LW : Live weight ; ADG : Average Daily Gain ; * * : Effect significant at 1 % level

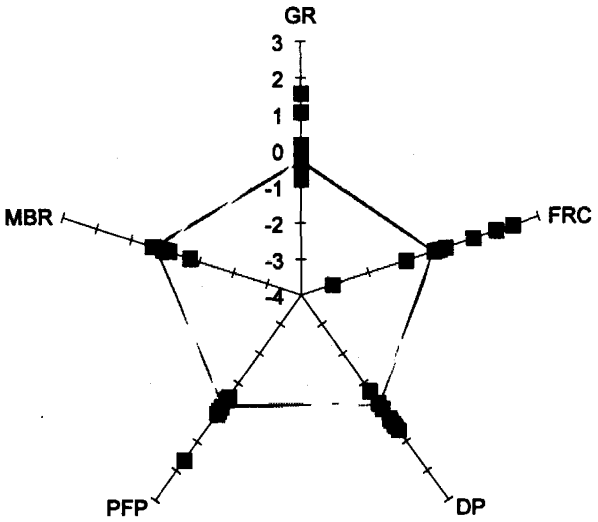
Individual feed consumption rises up gradually with age at slaughter; in the same time, feed conversion ratio goes up steadily (Table 3). The two fixed effects are significant. Margin between the two extreme strains for feed conversion ratio at 14 weeks is greater than 5 (Figure 2). These results are consistent with the bibliography (see for example OUHAYOUN, 1985).

Table 3 : Analysis of variance for variables describing feed efficiency

Slaughter Age	8 weeks			11 weeks			14 weeks		
Variables	N	FCR	FC	N	FCR	FC	N	FCR	FC
Mean	83	2,71	110	890	3,46	129	120	3,97	149
R^2		0,73	0,87		0,59	0,86		0,81	0,91
Residual Sid.		0,10	6		0,12	6		0,12	6
Strain		**	**		**	**		**	**
Serie		**	**		**	**		**	**

N: Number of collective cages ; FCR : Feed Conversion Ration ; FC : Feed Consumption ; * * : Effect significant at 1 % level

Figure 2: 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,



Growth and feed conversion ratio of the broilers

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REFERENCES

BLASCO A., OUHAYOUN J., MASOERO G., 1992. Study of rabbit meat and carcass. *V World Rabbit Congress, Corvallis, Oregon, USA.*, **B**, 775-786.

OUHAYOUN J., 1985. La croissance et le développement du lapin de chair. *Cuni Sciences*, **Vol. 1**, 1-15.

ROCHAMBEAU H. de, 1994. L'amélioration génétique du lapin en France: description et bilan. *CR. Acad. Agric. Fr.*, **80(4)**, 13-22.

ROCHAMBEAU H. de, RETAILLEAU B., POIVEY J.P., ALLAIN D., 1994. Sélection pour le poids à 70 jours chez le lapin. *VI Journées de la Recherche Cunicole, La Rochelle*, **Vol. 1**, 235-240.

Comparaison de 10 lignées commerciales de mâles terminaux : croissance et efficacité alimentaire - On compare la croissance et l'efficacité alimentaire, de lapereaux issus de 10 souches commerciales de croisement terminal. Les lapereaux ont été abattus à 8, 11 et 14 semaines. On a pesé et on a mesuré l'efficacité alimentaire en cages collectives de 8570 lapins. On analyse les données séparément pour chaque âge. La série de sevrage et le génotype du père ont un effet très significatif sur toutes les variables étudiées. A l'âge de 14 semaines et par rapport à l'écart type résiduel, le génotype du père a un effet important sur l'indice de consommation (rapport supérieur à 5), et modéré sur la vitesse de croissance