WORLD RABBIT SCIENCE 1995, 3 (1), 9-14.

EFFECT OF SIRE STRAIN, FEEDING, AGE AND SEX ON RABBIT CARCASS

BERNARDINI BATTAGLINI Marcella,
CASTELLINI C., LATTAIOLI P.

Istituto di Zootecnica Generale
Facoltá di Agraria, Universitá di PERUGIA - Italia

SUMMARY : The effect of sire strain, feeding plan, slaughter age and sex on the carcass quality were studied on 120 crossbred rabbits [White Giant (WG), Heavy Grimaud Frères (HGF), Light Grimaud Frères (LGF) with New Zealand White does]. Two feeding plans were used : plan H consisting of a high energy diet (10.42 MJ DE/kg ; 12.14 % DP) from weaning to slaughtering (75 days or 90 days of age) ; plan LH consisting of a low energy diet (9.85 MJ DE/kg ; 11.51 % DP) until 55 days, and a high energy diet up to 75 or 90 days. The sire strain affected growth performance and carcass traits ; the best results were obtained with progeny of WG at 90d. The sex effect was not significant and the feeding plan did not influence growth performance and carcass quality, because of the ability of the rabbit to adjust its feed intake to the energetic value of the diet. Delaying slaughter age, most of the traits improved, allowing heavy carcasses with very good qualitative characteristics to be obtained : Carcass yield 62.7 %, drip loss 2.7 %, reference carcass 1384 g, perirenal fat 2.1 % r.c., muscle/bone ratio of hing leg 7.6.

RÉSUMÉ : Effet de la souche mâle, de l'alimentation, de l'âge et du sexe sur la carcasse du lapin.
L'effet de la souche paternelle, de l'alimentation, de l'âge à l'abattage et du sexe sur la qualité de la carcasse, a été étudié sur 120 lapins croisés [Géant blanc (WG), Grimaud Frères Lourds (HGF), Grimaud Frères Légers (LGF), avec des lapines Néo Zélandaises Blanches]. Deux plans alimentaires ont été utilisés : le plan H consistait en la distribution, du sevrage jusqu'à l'abattage (75 ou 90 jours d'âge), d'un aliment à haute teneur énergétique (10,42 MJ/ED/kg ; 12,14 % PD) ; le plan LH consistait en la distribution du sevrage jusqu'à 55 jours d'un aliment pauvre en énergie (9,85 MJ ED/kg; 11,51 % ED) suivi de la distribution jusqu'à 75 ou 90 jours, de l'aliment riche en énergie . L'origine de la souche mâle modifie les performances de croissance et les caractéristiques de la carcasse. Les meilleurs résultats ont été obtenus avec les descendants de WG à 90 jours. L'effet du sexe n'était pas significatif et le plan d'alimentation n'a pas influencé les performance de croissance ni la qualité de la carcasse, sans doute à cause de la capacité du lapin à ajuster sa consommation en fonction de la valeur énergétique de l'aliment. En repoussant l'âge à l'abattage, la plupart des caractéristiques s'améliorent et l'on obtient des carcasses lourdes de très bonne qualité : rendement à l'abattage 62,7 %, perte au ressuyage 2,7 %, carcasse de référence 1384 g, gras périrénal 2,1 %, rapport muscle-os de la patte arrière 7,6.

INTRODUCTION

Italian rabbit production and marketing have achieved a high and constant level ; further increases in meat consumption require the marketing of portioned and processed products that can be obtained from heavier carcasses.

To reach this aim different strategies are possible : using large breeds or delaying slaughter age. Both of these approaches could negatively influence the quality of the end product (immature meat or excessively fat meat), discouraging consumer expectations. So, it is necessary to combine these procedures in order to individualize the optimum slaughter age for the chosen strains.

In fact the comparison between different strains, slaughtered at the same age, showed differences mainly ascribable to the different degree of somatic maturity (MASOERO *et al.*, 1986 ; OZIMBA and LUKEFAHR, 1991 ; PERRIER and OUHAYOUN, 1993).

As regards to the sex, the results are rather disagreeing, but most of the researchers (LUKEFAHR *et al.*, 1983 ; OZIMBA and LUKEFAHR, 1991 ; PARIGI-BINI *et al.*, 1992 ; LAMBERTINI *et al.*, 1994) found a little effect of this factor on the carcass quality.

The feeding is an important factor, especially when it modifies the growth rate (OUHAYOUN *et al.*, 1985-1986). It has been shown (OUHAYOUN and DELMAS, 1981) that fast growth promotes development of late tissues, such as fat ; on the contrary, slow growth causes an extended development of early organs and tissues (digestive tract, skin, bone), influencing the butchery value.

From a productive point of view the challenge is to find strategies which allow a good compromise to be obtained between good performance (high weight gain, low feed index) and qualitative characteristics.

To achieve this aim we carried out a 3-year research program to study the main factors (rabbitry, age, buck and doe strain, feeding plan) affecting rabbit production. The present investigation examined the effect of sire strain, feeding plan, sex and slaughter age.

MATERIALS AND METHODS

The study was carried out in the experimental rabbitry of the Istituto di Zootecnica and lasted 5 months (February-June). The environment was partially controlled ; temperature was 18.5°C ± 3.1 and 16 h/day photoperiod.

Sixty six New Zealand White does were divided into three homogeneous group (22 does per group) and were artificially inseminated 14 d after their second kindling with fresh semen collected from bucks of 3 different strains : White Giant (**WG**), Heavy Grimaud Frères (**HGF**) and Light Grimaud Frères (**LGF**) (dam line : INRA 1067 Hyplus ; Grimaud, heavy or light). The weight of the does was 3.65 ± 0.16 kg ; the bucks weighed : the WG 6.55 ± 0.21 kg, the HGF 5.43 ± 0.15 kg and the LGF 4.52 ± 0.13 kg. The choice of the hybrid males was made because it is a common procedure used by the Italian breeders.

Litters were weaned at 30 days of age and kits of each crossbreed were divided into two groups, homogeneous according to weight, sex and litter, in order to evaluate, for each sire strain, the influence of two feeding plans:

* plan H : a high energy diet (10.42 MJ DE/kg) from weaning to slaughtering
* plan LH : a low energy diet (9.85 MJ DE/kg) until 55 days and the high energy diet (10.42 MJ DE/kg) during the following period.

The diets had the same ratio of digestible protein (DP)/digestible energy (DE) : 11.65 - 11.68 g/MJ, but different contents of acid detergent fibre (ADF) : 17.38 *vs* 18.93, and acid detergent lignin (ADL) : 3.57 *vs* 4.06 %.

Both diets, given *ad libitum*, were formulated to obtain a good anatomical composition of the carcass (muscle/bone ratio, fatness) without reducing productive performance. The high energy diet met the needs of growing rabbits (LEBAS, 1989) with a protein level higher than recommended (17.05 *vs* 15.5 %) in order to improve the carcass quality (OUHAYOUN and CHERIET, 1983). The low energy diet was less energetic and more adapted to reduce the digestive disorders in the post-weaning period and it could also reduce fatness. Characteristics of the two diets are given in Table 1.

Table 1 : Composition, analytical data (% fresh matter) and nutritive value of experimental diets (means ± S.D.).

Ingredients %	Diet H	Diet L
Dehydrated alfalfa meal	33.0	39.0
Barley meal	29.0	22.0
Soybean meal	18.0	15.5
Wheat bran	9.0	12.0
Wheat straw	5.0	5.5
Soybean oil	1.5	1.5
Molasses	1.0	1.0
Calcium diphosphate	0.6	0.6
Vitamin-mineral premix*	0.8	0.8
Limestone	1.0	1.0
Lignisulfate	0.5	0.5
Salt	0.5	0.5
Coccidiostatic	0.06	0.06
DL-Méthionine	0.04	0.04
Chemical composition		
Dry matter %	*88.32 ± 0.20*	*88.85 ± 0.20*
Crude protein	17.05 ± 0.41	16.60 ± 0.38
Ether extract	3.90 ± 0.21	3.93 ± 0.27
Crude fibre	16.16 ± 0.63	17.70 ± 0.71
Ash	8.97 ± 0.18	9.34 ± 0.18
N-free extract	42.24 ± 0.34	41.28 ± 0.55
NDF	27.29 ± 0.79	29.42 ± 0.80
ADF	17.38 ± 0.44	18.93 ± 0.53
ADL	3.57 ± 0.17	4.06 ± 0.20
Cellulose	13.18 ± 0.31	14.17 ± 0.38
Hemicellulose	9.92 ± 0.81	10.49 ± 1.01
AIA	0.63 ± 0.12	0.70 ± 0.12
Digestible protein	12.14 ± 0.31	11.51 ± 0.27
Gross energy MJ/kg	16.71 ± 0.25	16.33 ± 0.15
Digest. energy MJ/kg	10.42 ± 0.18	9.85 ± 0.12
DP/DE g/MJ	11.65	11.68

*Added per kg : Vit. A 11,000 IU ; vit. D_3 2,000 IU ; vit. B_1 2.5 mg ; vit. B_2 4 mg ; vit. B_6 1.25 mg ; vit. B_{12} 0.01 mg ; vit. E 25 mg ; Biotine 0.06 mg ; vit. K 2.5 mg ; Niacine 15 mg ; Folic acid 0.30 mg ; D-panthotenic acid 10 mg ; Choline 600 mg ; Mn 60 mg ; Cu 3 mg ; Fe 50 mg ; Zn 15 mg ; I 0.5 mg ; Co 0.5 mg.

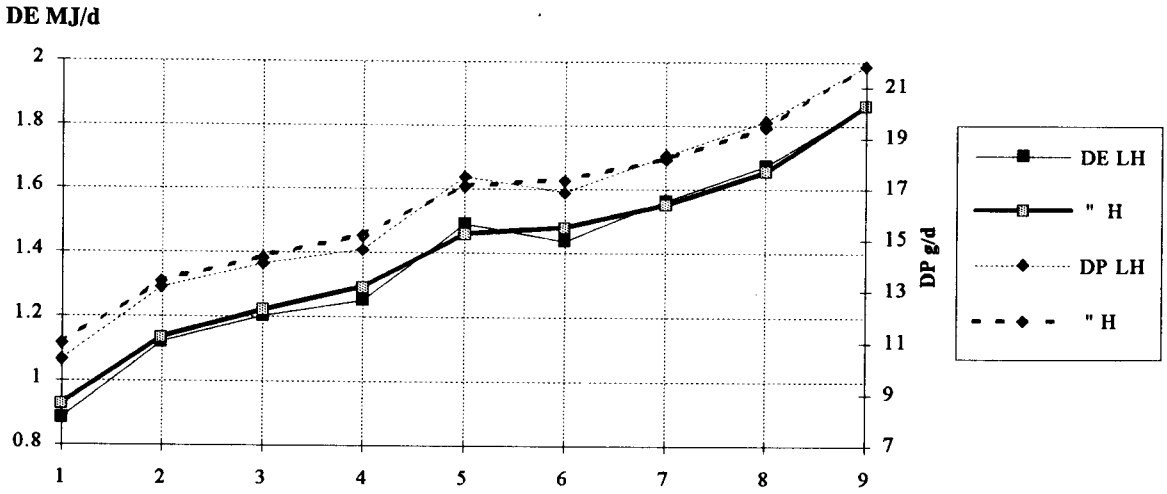
The protein and energy digestibility was determined on 10 rabbits for diet, by the classic procedure (ingesta/excreta balance). Collection period was 9 days, from the 56th to 64th day of age. Diets were given ad libitum and feed intake was recorded individually on the whole period ; total fecal excretion was collected individually every day at the same time.

Table 2 : Growth performance (ls. means, SE)

	Sire strain						Feeding plan		Sex		SE
	WG		HGF		LGF						
Slaughter age	75d	90d	75d	90d	75d	90d	H	LH	F	M	
Slaughter weight g	2455A	2805B	2532A	2721B	2540A	2697B	2642	2608	2622	2628	203
Weight gain g/d	38.9B	35.0A	39.7B	32.8A	40.4B	32.8A	36.1	35.5	36.0	35.8	4.4
Feed intake g/d	125A	156B	136A	155B	132A	152B	143	145	145	143	11
Feed conversion	3.2A	4.5B	3.4A	4.7B	3.3A	4.6B	3.9	4.1	4.0	4.0	0.4

A, B : P≤ 0.01

Figure 1 : DE and DP daily intake



Weeks

At 75 and 90 days of age, 40 animals per each terminal cross breeding were slaughtered. Without fasting, the carotid arteries and jugular veins were cut, the blood was drained and the skin, digestive tract, genital organs and bladder were removed. About one hour after slaughter, the carcasses were put in a ventilated cold room (+ 4°C) and chilled for 24 hours. After this time, linear measurements were made : dorsal length (between the atlas vertebra and the 7th lumbar vertebra), length of thigh (between the 7th lumbar vertebra and the distal part of *ischium*), lumbar circumference (at level of the 7th lumbar vertebra). Total length was obtained by adding dorsal and thigh lengths ; compactness was obtained using reference carcass weight/total length ratio (Ouhayoun, 1983). Successively the head (sectioned between occiput and atlas vertebra), liver, kidneys and organs of the chest and neck (lungs, oesophagus, trachea, thymus and heart) were removed, obtaining reference carcasses (bones, muscles and fat), as described by BLASCO *et al.* (1992). These were divided into three parts : fore part (section between the 7th and 8th thoracic vertebra) intermediate part (section between the 6th and 7th lumbar vertebra) and hind part (remaining part). The right hind leg (femur, tibia and fibula) was deboned.

Statistical analyses were done using the GLM procedure (SAS/STAT, 1990) with the following linear model :

$$y_{ijklm} = \mu + (\alpha\beta)_{ij} + \gamma_k + \delta_l + \varepsilon_{ijklm}$$

where
y_{ijklm} : experimental observation
μ : general mean
$(\alpha\beta)_{ij}$: effect of the interaction between sire strain (i = 3) and slaughter age (j = 2)
γ_k : effect of feeding plan (k = 2)
δ_l : effect of sex (l = 2)
ε_{ijklm} : residual experimental error

Table 3 : Slaughter data (ls means, SE)

		Sire strain						Feeding plan		Sex		SE
		WG		HGF		LGF						
Slaughter age		75d	90d	75d	90d	75d	90d	H	LH	F	M	
Live weight (l.w.)	g	2455A	2805B	2532A	2721B	2540A	2697B	2642	2608	2622	2628	203
Empty body weight	g	2224A	2637C	2276A	2479B	2286A	2460B	2412	2371	2391	2391	168
Skin + distal legs	%l.w.	15.7	16.8	15.6	16.3	15.7	16.4	16.0	16.2	15.8a	16.4b	0.9
Empty gastrointestinal tract	%l.w.	8.3B	7.1A	9.1C	8.4B	8.7BC	7.9B	8.2	8.3	8.2	8.3	0.4
Intestinal content	%l.w.	9.4B	6.0A	10.1B	8.9B	10.0B	8.8B	8.7	9.1	8.8	9.0	1.3
Hot carcass (h.c.)	g	1487A	1789Bb	1531A	1695Ba	1542A	1673Ba	1635	1604	1624	1615	128
Carcass yield	%l.w.	60.6a	63.8c	60.5a	62.3b	60.7a	62.0b	61.8	61.4	61.5	61.7	2.4
Drip loss	% h.c.	4.2C	2.8A	3.4B	2.6A	3.2B	2.8A	3.3	3.0	3.2	3.1	0.8
Cold carcass (c.c.)	g	1424A	1738Bb	1479A	1651Ba	1492A	1626Ba	1581	1556	1572	1565	150
Head	% c.c.	8.8C	7.2A	8.7C	8.0B	8.6BC	8.4BC	8.2	8.3	8.0A	8.5B	0.7
Liver	% c.c.	6.5	6.1	6.9	6.3	6.9	6.3	6.6	6.3	6.6	6.4	1.1
Reference carcass (r.c.)	g	1148A	1458C	1194A	1359B	1210A	1335B	1293	1275	1281	1286	77
Perirenal fat	% r.c.	1.42A	1.83AB	1.48A	2.28B	2.25B	2.25B	1.98	1.87	2.00	1.84	0.45

a, b, c : P≤0.05 ; A, B, C : P≤0.01

RESULTS

Growth performance

No variations in growth performance (Table 2) were obtained with respect to feeding plan and sex. During the first four weeks after weaning, and in the entire period, the experimental groups (H and LH) ingested similar amounts of digestible energy (1.15 MJ/d plan H *vs* 1.12 MJ/d plan LH) and digestible protein (13.4 g/d plan H *vs* 13.0 g/d plan LH). Some differences occurred in the 5th-6th week, while in the last three weeks the intakes were similar (Figure 1). In the 5th week, immediately after the diet change, the group LH continues to eat more feed than rabbits of H group and showed a better growth.

Although the differences were not significant, WG offspring showed lower weight gains from weaning to 75 d, but successively (75-90 d) the daily gains were higher. Feed intakes showed a similar trend, so that feed conversion indices were lower (n.s.) in WG progeny.

By delaying slaughter age, weight gains lowered, while feed intakes and conversion indices increased.

Slaughter data

Slaughter traits showed no differences with respect to feeding plan (Table 3) ; sex influenced significantly only the skin and head percentages, which were lower in the females.

Concerning sire strain, significant differences at 75 d were obtained for empty gastrointestinal tract, drip loss and perirenal fat. The drip loss was higher in WG descendants probably because of their lower body maturity, confirmed by the lower muscle/bone ratio and perirenal fat. An anomalous value was obtained for the gastrointestinal tract and could be ascribed to the less feed intake. The LGF progeny showed the highest percentage of perirenal fat due to its higher somatic precocity. At 90 d the best performance was obtained with WG progeny, which showed the highest carcass weight and yield and the lowest fatness. Offspring of HGF and LGF showed similar performance.

The slaughter age affected many traits. Percentage of gastrointestinal tract, drip loss, head and liver were lower at 90 d than at 75 d, while carcass yield and fatness were higher.

Carcass conformation and meatness

The considered factors did not affect part proportion, while conformation and muscle/bone ratio varied according to strain and age (Table 4). Progeny of WG had the longest carcass, the best compactness, and the highest muscle/bone ratio at 90 d, because the animals reached a good body maturity at this age. Length, compactness and muscle/bone ratio increased with age in each genetic type. The changes are mainly due to the differences in allometric growth as a matter of fact the muscles grow very faster than bones.

Table 4 : Carcass conformation and muscle/bone ratio (ls means, SE)

		Sire strain						Feeding plan		Sex		SE
		WG		HGF		LGF		H	LH	F	M	
Slaughter age		75d	90d	75d	90d	75d	90d					
Carcass length (L)	cm	34.9A	37.5Bb	35.4A	36.7Ba	34.6A	36.0Ba	35.8	35.9	35.9	35.8	1.66
Lumbar circumfer. (C)	cm	18.6	19.6	19.1	19.8	19.5	19.4	19.4	19.5	19.4	19.6	1.17
L / C		1.87AB	1.91B	1.85Ab	1.86AB	1.77Aa	1.87AB	1.85	1.86	1.87	1.84	0.11
Compactness		32.9A	38.9D	33.7A	37.0C	34.9B	37.1C	36.1	35.5	35.7	35.9	1.59
Fore part	% r.c.	29.9	29.3	29.7	29.3	29.6	30.9	29.8	29.7	29.7	29.9	2.37
Intermediate part	% r.c.	32.9	34.5	33.6	34.1	34.1	33.8	33.4	34.3	34.3	33.4	2.63
Hind part	% r.c.	36.7	36.1	36.6	36.6	36.2	35.2	36.6	35.8	33.9	33.9	1.83
Muscle/bone ratio		6.4Aa	8.1C	7.0Ab	7.3B	6.8AB	7.3B	7.2	7.2	7.3	7.1	0.76

a, b, c : P≤0.05 ; A, B, C : P≤0.01

DISCUSSION AND CONCLUSION

Under our experimental conditions, sire strain had interactive effect with age : WG offspring had lower weight gains, from weaning to 75 d, but successively (75-90 d) the daily gains were greater relating to the different adult weight of the sire strain. The lower initial growth ability of the WG progeny denotes a less somatic precocity (OUHAYOUN, 1983).

Concerning carcass quality, a better interpretation of the data is possible taking into account allometry relations of different organs and tissues, even if a perfect harmony between weight and physiological maturity is not always observed.

In this connection, it is useful to remember that the skin and the fat present a progressive increase of their allometry ; on the contrary the gastrointestinal tract and the skeleton have a decreasing allometry. For muscles, allometry becomes decreasing from an empty body weight equal to 2450 g, for liver from about 1600 g (OUHAYOUN, 1983).

The results obtained at 75 days of age denote a lesser maturity degree of the WG progeny : higher drip loss, lower fat level and muscle/bone ratio.

At 90 days of age the WG progeny reached a good commercial maturity : in fact carcass yield, reference carcass weight and muscle/bone ratio showed higher values than in the other crossbreeds.

The compactness was superior too, probably because of the greater growth speed during the period from 75 until 90 d of age.

Offspring of HGF and LGH showed similar results with a good commercial maturity since 75 days.

The sex effect was not important ; in fact, sexual dimorphism, expressed by a weight superiority of the females, is not evident before 15 weeks of age (OUHAYOUN, 1984). The feeding plan did not affect growth performance and carcass quality probably because the nutritive values of the diets were not very different. The two groups consumed similar quantities of DE and DP by adjusting their feed ingestion level, so the carcass quality did not change. Other researchers (LEBAS *et al.*, 1982 ; XICCATO *et al.*, 1993) have shown that moderate changes in feeding strategies do not cause significant modifications in the final product.

The differences in conversion index during the entire growing period were not remarkable (3.96 plan H *vs* 4.08 plan LH). As already shown, in the first week after diet change, LH group continued to eat more feed than H group. Similar behaviour was also observed by LEBAS *et al.* (1982) who ascribed it to an imperfect autoregulation of rabbits subjected to an alternation of diets with different energetic concentrations.

The slaughter age significantly improved most of the quality traits, with little increase in perirenal fat (2.1 % at 90 d *vs* 1.7 % at 75 d).

It can be concluded that it is possible to produce a heavy carcass with very good qualitative characteristics, using the terminal crossbreedings from WG, HGF and LGF sire strains, and the New Zealand White dam strain, and delaying slaughter age. The production cost is higher and does not make up for the higher weight, but processor and consumer requests are satisfied.

The best performance was obtained with WG sire strain but its utilization could cause problems because the bucks have poor libido and cause a

reduction in litter size, without improving weaning weight (BERNARDINI BATTAGLINI *et al*, 1993). The evaluation of other more suitable heavy strains (PERRIER and OUHAYOUN, 1993) could be useful.

Acknowledgments : Research supported by the National Research Council of Italy. Special project RAISA. Sub project n3. Paper n° 1718.

The authors wish to thank M. Moschini, D. Parasecoli and P. Trubbianelli for their collaboration.

Received : May 6, 1994
Accepted : January 23, 1995

BIBLIOGRAPHY

BERNARDINI BATTAGLINI M., CASTELLINI C., LATTAIOLI P., 1993. Aspetti quanti-qualitativi della produzione di carne di coniglio : influenza del tipo genetico paterno, dell'età di macellazione e dell'allevamemnto. In : *Atti X Congr. Naz. ASPA, Bologna, 563-570.*

BLASCO A., OUHAYOUN J., MASOERO G., 1993. Harmonization of criteria and terminology in rabbit meat research. *World Rabbit Sci., 1 (1), 3-10.*

LAMBERTINI L., BENASSI M.C., ZAGHINI G., 1994. Ricerche sulla composizione della carcassa cunicola : influenza del sesso, del tipo genetico e dell'età di macellazione. *Coniglicoltura, 31 (3), 33-37.*

LEBAS F, 1989. Besoins nutritionels des lapins. Revue bibliographique et perspectives. *Cuni-Siences, 5, 1-28.*

LEBAS F., LAPLACE J.P., DROUMENQ P., 1982. Effet de la teneur en énergie de l'aliment chez le lapin. Variation en fonction de l'âge des animaux et de la séquence alimentaire. *Ann. Zootech., 31, 233-256.*

LUKEFAHR S., HOHENBOKEN W.D., CHEEKE P.R., PATTON N.M., 1983. Appraisal of nine genetic groups of rabbits for carcass and lean yield traits. *J. Anim. Sci., 57 (4), 899-907.*

MASOERO G., UBERTALLE A., MAZZOCO P., BIANCHI M., CHICCO R., 1986. Incrocio su coniglie bianche di Nuova Zelanda e Californiane. Caratteristiche della carcassa e della carni. *Ann. Ist. Sper. Zootec., 19, 67-84.*

OUHAYOUN J., 1983. La croissance et le developpement du lapin de chair. *Cuni-Sciences, 1, 1-15.*

OUHAYOUN J., 1984. Croissance et qualités bouchères du lapin. *Cuniculture, 11 (4), 181-188.*

OUHAYOUN J., DELMAS D., 1980. Influence du niveau protéique du régime sur le developpement corporel de lapins Néozélandais. *In : Memoria II Cong. Mund. de Cunicultura, vol. 2, 93-100.*

OUHAYOUN J., CHERIET S., 1983. Valorisation comparée d'aliments à niveaux protéiques différents par des lapins sélectionnés sur la vitesse de croissance et par des lapins provenant d'élevages traditionnels. 1 - Etude des performances de croissance et de la composition du gain de pods. *Ann. Zootech., 32, 257-276.*

OUHAYOUN J., LEBAS F., DELMAS D., 1985-86. La croissance et la composition corporelle du lapin : influence des facteurs alimentaire. *Cuni-Sciences, 3, 7-21.*

OZIMBA C.E., LUKEFAHR S.D., 1991. Evaluation of purebred and crossbred rabbits for carcass merit. *J. Anim. Sci., 69, 2371-2378.*

PARIGI-BINI R., XICCATO G., CINETTO M., DALLE ZOTTE A., CONVERSO R., 1992. Effeto dell'età, del peso di macellazione e del sesso sulla qualità della carcassa e della carne cunicola. 1 - Rilievi di macellazione e qualità della carcassa. *Zoot. Nutr. Anim. 3/4, 157-173.*

PERRIER G., OUHAYOUN J., 1993. Utilisation du mâle ZIKA en croisement terminal avec des femelles hybrides. Croissance et caractéristiques bouchères des produits. *Cuniculture, 20 (4), 179-184.*

SAS/STAT, 1990. User's guide, Version 6, Cary, NC, USA.

XICCATO G., CINETTO M., DALLE ZOTTE A., 1993. Influenza del piano alimentare e dell'età di macellazione sulle prestazioni e sulla qualità della carcassa di coniglio. In : *Atti X Congr. Naz. ASPA, Bologna, 571-577.*