PRODUCTIVITY OF RABBIT DOES OF A WHITE POPULATION IN ALGERIA

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ABSTRACT

Reproductive performance of 172 rabbit does of the "White strain" (638 litters) were registered in the Djelba rabbitry in Algeria between July 2005 and February 2007. The does were issued from commercial French hybrid rabbits (Hyplus, Grimaud Frères) imported in Algeria in 1985-86 and bred without external introduction since that time. Does were generally mated 8-14 days after kindling and eliminated after 3 infertile mating. Young were weaned when 30-35 days old. On average litter size at birth was 7.14±2.42 total born, of which 6.67±2.76 born alive. Litter size at weaning was 5.75±2.42. Stillbirth proportion was 7.34% of total kits born, and birth to weaning mortality was 15.8% of kits born alive. Prolificacy was similar to that observed for does of the local population, but kit mortality was lower. The average does live weight at mating was 15% higher than that of the local population (3.3 vs. 2.9 kg). Effects of parity and of season were also analysed. The does of the White population have a moderated prolificacy, similar to that of the local population maintained on closed population since much longer. On the other hand, because of a weak interval between two litters, the numerical productivity (weaned/doe/year) seems clearly higher than that noted for the local population. It will be advisable to check this important point for the future of the strain, while working under better controlled conditions of recording (for example including females not having never weaned but having occupied the places of reproduction in the breeding) and in situations of breeding different from those of the unit of breeding of the cooperative which profits from a strong technical farming because of its role in the maintenance and the diffusion of the White Strain. Finally it will be interesting to compare the performances of reproduction of this White Strain with those of the Synthetic Strain in the course of creation in Algeria.

Key words: Rabbit**,** Algeria, Reproduction traits, White population.

INTRODUCTION

During the Eighties, Algeria imported the commercial "hybrid" rabbits (strains Hyla and Hyplus) of the France, but did not organize the renewal from the parental lines. The replacement of the reproducers was carried out on the spot, while choosing among the subjects normally intended for butchery. This practice was maintained so far, practically without external contribution, in particular in the cooperative of Djelba charged to diffuse reproducers near the stockbreeders. It thus gradually constituted a population which is designated locally under the name of "white line" and which from now on is often used by the stockbreeders of the area. It is interesting to compare the performances of reproduction of this White Strain with those of the Synthetic Strain in the course of creation in Algeria (Gacem and Bolet, 2005). The present communication has the aim of describing the performances of reproduction of this "white Strain».

MATERIALS AND METHODS

Origin of the animals and the data

The performances of 172 does (638 parturitions) were recorded from their cards of breeding. They cover the parturition released between July 2005 and February 2007. Those does were issued from commercial French hybrid rabbits (Hyplus, Grimaud Frères) imported in Algeria in 1985-86 and bred without external introduction since that time. They all are albinos. Some were completely white while others are carrying gene "himalayan" characterizing Californian rabbits used for the constitution of the initial hybrids. The does were crossed with bucks resulting from this strain or of the local population which are bought outside (near the stockbreeders). There was not any well defined diagram of selection; the plans of couplings were random just as for the choice of the reproducers. The main objective is to produce the maximum of animals intended for the sale as reproducers and also in carcasses (restaurants and others).

The site of breeding

The unit of breeding of Djebla is located in the commune of Ouaguenoune at 18 km at the north of Tizi-Ouzou. It is located at an altitude of 135 m. The climate is of Mediterranean type, heat in summer and cold and wet in winter

The building of a surface of 330 m² includes/understands in particular 110 wire mesh cages of reproduction placed on one single level. In the same room are located 120 collective cages of fattening and 192 individual cages intended for the future reproducers (renewal and sale).

The females were presented to a male between 8 and 14 days after the parturition. However after birth of a lower litter's, the mating can be carried out post partum. It can also be carried out later if the female requires it. The females were presented to a male at a minimum weight of 2.5 kg corresponding to an age from 3.5 to approximately 4 months. The unfertile females were eliminated after 3 successive failed matings. A diagnosis of gestation was made by abdominal palpation between 12th and the 14th days after the mating. The females that proved negative were presented again to a male. Nest boxes were placed 3-4 days before the day of parturition. The does were received *ad libitum* the commercial pelleted fed (17% crude proteins and 13% crude fibre). Water was always available from automatic drinkers. Litter size and weight were obtained at birth and at weaning (34-35 day after parturition, but sometimes as of 30 days).

Statistical analysis

Recorded data were analyzed using the analysis of variance according to linear model using a fixed effect (procedure GLM, SAS, 1988). The model included the fixed effect of the parity for the whole of the data (5 levels: 1 to 5 and more) and the season of kindling (3 calendar month old sections) for the litters of first parity (because of the too heterogeneous distribution of the litters of other litters number according to the season). Taking in account number of data observed only 3 seasons were taken into account. Mortalities were analyzed by total test of chi² and mortalities by class were compared 2 by 2 per test of Fisher (SAS, 1988). The fertility rates was estimated in an indirect way by the interval between kindling.

RESULTS AND DISCUSSION

Average characteristics of the white population

The does of the white population were characterised by a low prolificacy (7.14 born totals). It's similar to that observed by Daoud-Zerrouki (2006) of the local population at the university of Tizi Ouzou under similar conditions (7.20) (Table 1). This prolificacy is clearly lower than that of the hybrids at

the origin of the strain (9.8 total born per parturition; Brun and Saleil, 1994) and lower than that of the parental lines of these hybrids (8.5-8.6 according to these same authors). At weaning, the litters are a little more numerous in the White strain than in the local population (5.75 vs. 5.45 weaned per weaning). This is most probably a consequence of lower rate of still birth (7.3 vs. 16.0). It is plausible that the conditions of breeding explain a great part of this variation: the breeding is confined less in Djelba than at the University of Tizi-Ouzou, but one should not exclude a variation of genetic origin.
The weight of the females, although the few number of does weighing at mating, it proves that these weighed 15% more than the local population does: 3.34 vs. 2.90 kg.

The average interval between two litters (44.4 days) led to a theoretical productivity of 8.22 litters per year and 7.97 weaning, is 45.8 rabbits weaned/female/year. It should however be stressed that this calculation remains "optimistic" since the does not having never weaned young rabbits for example, are taken into account. In spite, it appears that this productivity of 45.8 weaned young /female/year is similar with that is obtained in France (47.1 weaned/doe/year) in forty breeding farms Renalap used natural mating (Azard and Lebas, 2006). In addition, this result was higher than the value estimated by the local population in the area, a well in experimental farm and in17 breeders (29-32 rabbit weaned/female/year; Zerrouki *et al*., 2005).

Table 1: Reproductive performance of the White population does in comparison with those observed on the local Population of the area, described by Daoud-Zerrouki (2006) (number of observations, average and standard deviation of the population)

Performances	White population (present study)			Local population (Daoud-Zerrouki, 2006)		
	Data	Mean	Standard error	Data	Mean	Standard error
Weight at mating (g)	43	3340	416	320	2900	341
Interval between 2 litters (days)	460	44.4	12.6	-	-	-
Fertility (% fertil matings)	-	-	-	1017	73.5	43.5
Total born/parturition	637	7.14	2.42	749	7.20	2.43
Born alive/parturition	637	6.67	2.76	663	6.16	2.53
Litter weight at birth (g)	14	439	108	663	296	113
Average kits weight at birth (g)	14	62.0	10.0	663	49.5	10.0
% Stillborn	637	7.3	25.9	633	16.0	22.8
Weaned/weaning	617	5.75	2.42	550	5.45	2.10
Litter weight at weaning (g)[1]	19	3448	1159	550	2296	800
Average kits weight at weaning (g)[1]	19	557	141	550	450	112
% birth to weaning mortality	617	15.7	25.2	550	14.0	19.2

[1]Weaning at 35th days for White population and 28th days for the local population

Effect of parity

So as to minimize the effect of the infertile does eliminated precociously, the effect of the number of litter was analyzed on the 100 does which carried out at least 4 litters during the period of study. The effect was significant for the number of born total and kits born alive, on the interval between two litters and on the stillbirth or in suckling period. Classically, the litter size at birth increased to the third parity (Table 2) then tends to decrease slightly then. Because of a high mortality during the suckling period particularly in the parity 3 and 4 (17 and 23% against 11 to 14% for the other numbers of litters), the differences in size of litter were attenuated with weaning and were not significantly.

Effect of season in first parturition

The distribution of the parturition according to the seasons is very unequal. So it was difficult to us to make a complete analysis of the effect of the season starting from the 638 parturitions low available, if one wants to avoid confusion with other effects like that of the order of parity. The effects of the season are thus presented hereafter by limiting us to the first litters distributed better, and for 3 seasons only. On the 171 litters studied, the season of kindling of does was not a significant effect on the litter size at birth or at weaning (Table 3). On the other hand the still birth is significantly weaker in winter (1.47%) that in summer or autumn (7.98 and 7.10%). In the same way, the mortality between birth and

weaning was significantly higher in autumn (19.7%) that for the two other seasons taken together (14.1%, P=0.014). It seems important to us to retain that the extreme periods of temperature (summer or winter) exerts little influence on the productivity of the does. We find thus for this "White population" a similar results to those observed by Zerrouki et al. (2004) on the local population rabbit's on the same area.

Table 2: Variation of the reproductive performance according to the parturition of does having carried out at least forth litters (the highest litters of observations is the 8th range)

		Parity					rCV(%)	Prob.
		1	2	3	4	5 or +		
Litters		100	100	99	100	68	-	-
Which	Summer kindling	58	0	0	1	6	-	-
	Autumn kindling	35	86	60	0	0	-	-
	Winter kindling	7	11	32	77	27	-	-
	Spring kindling	0	3	7	22	35	-	-
Interval between 2 kindling (days)		-	46.3a	41.1b	43.4ab	41.8b	24.3%	0.004
Total born/parturition		6.60a	6.78a	7.89b	7.68b	7.25ab	33.6%	<0.001
Born alive/parturition		6.12a	6.50ab	7.37b	7.01ab	6.63ab	41.0%	0.018
% Stillborn		7.27bc	4.13a	6.53b	8.73c	8.52c	-	0.007
No. kindling with 1 born alive and +		96	98	97	95	67	-	-
Weaned/kindling with 1born alive and +		5.51	5.88	6.28	5.71	5.93	42.0%	ns
Birth to weaning mortality (%)		13.6ab	11.4a	16.6b	22.7c	12.0a	-	<0.001

Means with different letters on the same row differ significantly (P<0.05)
rVC = Variation Coefficient

Table 3: Reproductive performance at first parturition does, according to the season

	Season			rCV (%)	Prob.
	Summer	Autumn	Winter		
Number of litters	77	73	21	-	-
Total born/parturition	6.69	6.37	6.48	37.0%	ns
Born alive/parturition	6.16	5.92	6.38	44.0%	ns
% Stillborn	7.98a	7.10a	1.47b	-	P= 0.028
No. kindling with 1 born alive and +	75	71	21	-	-
Weaned/kindling with 1 born alive and +	5.43	4.89	5.43	46.0%	ns
Birth to weaning mortality (%)	14.1	19.7	14.9	-	P= 0.070

a, b: Means with same letters on the same row not differ significantly (P = 0.05)
rCV= Variation Coefficient

CONCLUSIONS

The does of the White population have a moderated prolificacy, similar with that of the local population maintained on closed population since much longer. On the other hand, because of a weak interval between two litters, the numerical productivity (weaned/doe/year) seems clearly higher than that noted for the local population. It will be advisable to check this important point for the future of the strain, while working under better controlled conditions of recording (for example included of the females not having never weaned but having occupied of the places of reproduction in the breeding) and in situations of breeding different from those of the unit of breeding of the co-operative which profits from a strong technical farming because of its role in the maintenance and the diffusion of the White Strain. Finally it will be interesting to compare the performances of reproduction of this White Strain with those of the Synthetic Strain in the course of creation in Algeria.

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REFERENCES

Azard A., Lebas F. 2006. Productivité des élevages cunicoles professionnels en 2005. Résultats de RENALAP et RENACEB. *Cuniculture Magazine, 33, 92-96*.

Brun M., Saleil G. 1994. Une estimation, en fermes, de l'hétérosis sur les performances de reproduction entre les souches de lapin INRA A2066 et INRA A1077. *In: Proc. 6èmes Journées de la Recherche Cunicole, La Rochelle, France, 203-210*.

Daoud-Zerrouki N. 2006. Caractérisation d'une population locale de lapins en Algérie: évaluation des performances de reproduction des lapines en élevage rationnel. *Thèse Doctorat, University of Tizi-Ouzou, Algeria, 131 pp*.

Gacem M., Bolet G. 2005. Création d'une lignée issue du croisement entre une population locale et une souche européenne pour améliorer la production cunicole en Algérie. *In: Proc. 11èmes Journées de la Recherche Cunicole, 2005 November, Paris, France, 15-18*.

SAS 1988. SAS/STAt for Micro, (Release 6.02). *SAS Inst Inc. Cary NC, USA*.

Zerrrouki N., Bolet G., Berchiche M., Lebas F. 2004. Breeding performance of local Kabylian rabbits does in Algeria. *In: Proc. 8th World Rabbit Congress, 2004 September, Puebla, Mexico, 371-377*.

Zerrouki N., Kadi S.A., Berchiche M., Bolet G. 2005. Evaluation de la productivité des lapines d'une population locale algérienne, en station expérimentale et dans des élevages. *In: Proc. 11èmes Journées de la Recherche Cunicole, 2005 November, Paris, France, 11-14*.