

# DOE RABBIT PERFORMANCE IN MARTINIQUE

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**Abstract** - An attempt was made to study the reproductive performances of doe rabbits reared in Martinique. Data (1471 kindlings) were collected from 5 farms between February 1994 and September 1995. The average litter sizes at birth were respectively  $7.64 \pm 2.62$  born total,  $6.98 \pm 2.79$  born alive, and  $4.84 \pm 2.79$  young rabbits at weaning. The average values for mortality were  $0.66 \pm 1.53$  stillborn and  $2.24 \pm 2.54$  dead between kindling and weaning. The number of mating per kindling was  $1.31 \pm 0.68$ .

The litter size at birth was significantly different between month of weaning ( $P < 0.05$ ). The number of stillborn and the litter size at weaning were significantly different between farms ( $P < 0.05$ ). The percentage of stillborn was significantly lower in litter size at birth including between 6-9 than 1-5 and more than 10 rabbits (6.95% vs 10.75% and 10.69%). Prewearing mortality was higher in litter size higher than 10 than in those with 1-5 or 6-9 rabbits (39.53% vs 25.96% and 28.29%). The general level of mortality was quite high, fully more than 40 % of total young born died before weaning.

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## INTRODUCTION

In the Caribbean Islands, rabbit breeding is developing rapidly. Several attempts have been made recently in different countries to develop and intensify this activity. They were faced with limiting factors such as farmer's training, need for equipment, need for breeding does and broilers, production of animal feeds and isolation of some raising units. Generally, most of results obtained in this area show that performances remain relatively lower that results obtained in temperate environment (MATHERON *et al.*, 1985 ; RASTOGI, 1991 ; DEPRES *et al.*, 1991 ; DEPRES *et al.*, 1994).

The level of intensification is extremely variable among islands and the results obtained are not always transposable from one country to another. Beside, MATHERON *et al.* (1985) and DEPRES *et al.* (1994) have shown the unfavourable effect of hot and wet season on the reproductive performances of doe rabbits reared in Caribbean islands.

The purpose of this study was to analyse the litter size performance and to estimate the effect of farms, month of weaning and litter size on the reproductive performances of doe rabbits reared under semi-intensive conditions in Martinique.

## MATERIAL AND METHODS

Data were collected from 5 farms units in Martinique between February 1994 and September 1995. Rabbitries were populated with locally adapted stock of mixed breeding, including contributions from several breeds - New Zealand White, Californian and local breed. All the does were kept in semi-open buildings including commercial hutches. All of them were equipped with a feeder and an automatic watering device and a nest box. All the does were fed with commercial pellets based on cereals and cakes (16.5 % crude protein, 2.3 fat and 15 % crude cellulose). All the does were assigned to an semi-intensive system of reproduction in which they were presented to the male for the first time at 9-11 days post-kindling.

The management of the rabbit breeding in the farms can be considered to be of a reasonably good standard. There was a rather low level of parasitism and no incidence of mites or score hocks was observed during this period.

Collecting breeding data was executed with an individual record keeping system : "C.P.L." which is a system developed by I.N.R.A and I.T.A.V.I. The main variables measured were : the litter size at birth, born total (NT),

born alive (NV) and at weaning (NSEV), the mortinatality (NM : No of stillborn) and the post-partum mortality (MNS : No of kits dead between kindling and weaning) and the No of matings by kindling (NUMSAI). Litter sizes were studied using an analysis of variance (GLM procedure of SAS software; SAS, 1987) integrating the breeding (3 modalities), the month of weaning (12 modalities) and interactions between breeding and weaning month. Two of five farms (No 4 and 5 in table 1) were withdrawn of the model of analysis because data were collected from less than 12 months. Mortality were analysed using contingency tables (Freq procedure of SAS) integrating the total number of kits born (3 modalities : 1-5; 6-9 et > 10). Afterwards either analyse, a Chi-square or a Fischer's test were used. The calculations were made on the IBM 3090 computer at the Genetic Animal Department of INRA.

**Table 1 : Litter size performance of doe rabbits, general and by breeding means and**

	N	NT	NV	NSEV	NM	MNS	NUMSAI
General :	1471	7.64±2.62	6.98±2.79	4.84±2.79	0.66±1.53	2.24±2.54	1.31±0.68
By farm :							
1	187	7.69±2.39	7.06±2.71	5.27±2.63	0.62±1.32	3.82±2.20	1.12±0.36
2	316	8.06±2.77	7.27±2.85	4.76±2.85	0.79±1.50	2.68±2.71	1.20±0.52
3	484	7.66±2.52	7.15±2.68	5.29±2.64	0.51±1.29	1.93±2.27	1.41±0.79
4	370	7.39±2.73	6.62±2.95	4.00±2.91	0.76±1.89	2.76±2.89	1.36±0.74
5	114	7.10±2.40	6.44±2.56	5.26±2.51	0.65±1.54	1.34±1.75	1.35±0.64

N : No litters; NT : born total ; NV : born alive; NSEV : kits at weaning ; NM : stillborn; MNS : kits dead between kindling and weaning; NUMSAI : No mating by kindling.

## RESULTS AND DISCUSSION

The general and by farms means in table 1 were comparable with those reported in tropical environment (DAMODAR and JATKAR, 1985; MATHERON *et al.*, 1985; RASTOGI, 1991), but were inferior to those reported by DEPRES *et al.* (1994). The average value for litter size at birth (NT and NV) and at weaning were 7.64, 6.98 and 4.84 respectively. The average number of stillborn and kits dead between kindling and weaning were 0.66 and 2.24 respectively. The average number of mating per kindling was 1.31.

**Table 2 : Effect of breeding and month of weaning on litter size (N=987)**

	Weaning's month	Breeding	Breeding x month of weaning	RSD
NT	*	NS	NS	2.56
NM	NS	*	NS	1.36
NV	*	NS	NS	2.73
NSEV	T	*	NS	2.69

NS : no significant, \* : P < 0,05; T : P < 0,1.

NT : total born ; NM : stillborn; NV : born alive; NSEV : No kits at weaning.

The litter size at birth varied significantly with the month of weaning (Table 2). This is in accordance with the previous results of MATHERON *et al.* (1985) and DEPRES *et al.* (1994). It has been shown previously that in tropical climate, heat and moisture had a bad influence on reproductive performances of rabbit does reared in semi-intensives conditions. In our study, litter size at birth (born total and alive) increased between January

and June. In contrast, during the unfavourable period (from July, to December), the number of born total and alive decreased (Figure 1).

The effects of farms on litter size are shown in table 2. The number of stillborn and the litter size at weaning were affected by farms. This means that the perinatal and preweaning mortality were influenced by the breeding management ability. Two hypotheses, which are not exclusive, can explain this impairment of survival rate : the management of young rabbit does was not appropriated (age at the first mating, replacement rate), and nutrient requirements were not always satisfied for nursing does (breaking of feed concentrate).

The interaction of farms x month of weaning was not significant for all of variables analysed.

Figure 1 : Litter size at birth by month of weaning (NT : born total and alive)

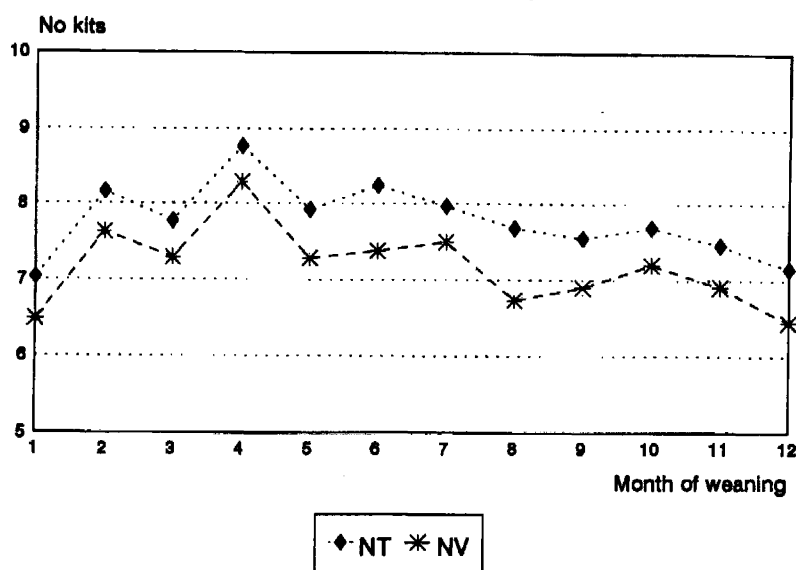


Table 3 : Effect of litter size on mortinatality (% stillborn) and mortality between kindling and weaning (N=1471).

	Litter size (total born)			X <sup>2</sup>
	1-5	6-9	>10	
No of litters	301	819	351	
Stillborn (%)	10,75b	6,95a	10,69b	***
Dead between kindling and weaning (%)	25,96a	28,29a	39,53b	***

a,b means without a common superscript are different at  $P < 0,05$ . \*\*\* :  $P < 0,001$ .

The mortinatality and the preweaning mortality between different litter sizes at birth (born total) are examined in table 3 and the conclusions are comparable with those reported by ROUSTAN (1980) in European farms. 3 groups of litter size (born total) were determined : 1 to 5, 6 to 9 and > 10. The percentage of stillborn and the percentage of kits dead between kindling and weaning were significantly different between litter sizes at birth. The percentage of mortinatality was significantly smaller in litter size including between 6-9

(6.95%) than the other groups : respectively 10.75% and 10.69%. Preweaning mortality was higher in litter sizes > 10 than others groups (39.53% vs 28.29% and 25.96%). The viability decreased with the litter size at birth. This results showed that the optimum litter size was included between 6-9 kits total born by litter. However, the general level of mortality was quite high and comparable with those reported by MATHERON *et al.* (1985) and RASTOGI (1991). This means that fully more 40 % of the total kits born died before weaning.

Fully 20 % of the breeding does produced only between 1 and 5 kits born total. The frequency of "small" litter size (<6 born total) was quite high and the hypothesis of a inadequate breeds or bad management of youngs is plausible to explain this phenomenon.

## CONCLUSION

The doe performance traits reported in this study were comparable with those reviewed and reported by different authors in Caribbean island, but were inferior to those observed in temperate climate. Beyond the unfavourable effect of the season, some of these differences in performances were connected with high frequency of "small" litter size and quit high general mortality. The improvement in management of mating and reproductive replacement and the satisfaction of nutrient requirements for nursing does could certainly increase the doe performances in Martinique. Beside, the generalization of cross-fostering to equalize the litter size between 6-9 kits, could to enable to control the mortality between kindling and weaning.

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**Performance de reproduction de la lapine en Martinique** - Dans cette étude, nous avons analysé les performances de reproduction de lapines élevées en Martinique. 1471 portées issues de 5 élevages ont été analysées de Février 1994 à Septembre 1995. Les tailles de portée à la naissance et au sevrage étaient respectivement de  $7.6 \pm 2.62$  nés totaux,  $6.98 \pm 2.79$  nés vivants et  $4.84 \pm 2.79$  sevrés. La mortalité se répartissait de la façon suivante :  $0.66 \pm 1.53$  morts nés et  $2.24 \pm 2.54$  lapereaux morts entre la naissance et le sevrage. Le nombre de saillie par mise bas était de  $1.31 \pm 0.68$ . La taille de portée à la naissance était significativement différente selon le mois de sevrage ( $P < 0.05$ ). L'élevage affectait de manière significative le nombre de morts nés et la taille de portée au sevrage ( $P < 0.05$ ). La mortalité était significativement plus faible dans les portées comprises entre 6-9 lapereaux nés totaux que celle observée dans les groupes de portées comprises entre 1-5 et plus de 10 nés totaux (6.95% vs 10.75% et 10.69%). Par ailleurs, la mortalité entre la naissance et le sevrage était plus élevée sur les tailles de portée supérieure à 10 que sur celle observée dans les autres groupes (39.53% vs 28.29% et 25.96%). La mortalité totale était relativement élevée, globalement supérieure à 40%.

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