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# **EFFECT OF DISEASE PROCESSES ON REPRODUCTIVE PERFORMANCE OF RABBIT DOES.**

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## **ABSTRACT**

This paper evaluate the prevalence of the culling and death causes in reproductive females from a nucleus. In addition, the effect of disease processes on reproductive performance of does is examined. A total of 1116 females from one line selected for litter size at weaning were used in the experiment. The period of observation was comprised between April '92 and January '98, seven selection generations.

The culling percentage of healthy and sick females were respectively, 49% and 33%. The remaining 18% were dead does for different causes. The mayor cause of culling and death were reproductive problems, 14.8% and 4.93%, respectively (refused to mate, infertile does, abortions, mummified foetus, etc...). Reproductive problems were divided in two depending on the period of time between kindling and culling of the doe. The respiratory process was the next more important cause of culling and death, 6.6% and 4%, respectively.

No differences were found in litter size and number of born alive between healthy does (9'4 and 8'1, respectively) and culled females for pathology causes like respiratory process and reproductive problems (1). On the other hand, litter size and number of born alive were higher in culled females with mastitis (10'7 and 9'6) and reproductive problems (2)(10'9 and 9'1), as well as in dead females with respiratory processes (10'4 and 9'3) and reproductive problems (1) (10'8 and 9'3). The number of weaned was similar between healthy does and does with mastitis and reproductive problems (1) and was lower for the rest of studied causes. Healthy does had a higher number of kindling (10.5) in comparison to sick or dead does (from 3 to 6 kindling).

## **INTRODUCTION**

To cull sick productive females is a way to improve the economy of rabbit producers. The pathological processes are widely diffused amongst animals and the best prophylactic measures are culling of sick animals and environmental disinfection. Avoiding a greater diffusion of the infecto-contagious diseases reduces the replacement costs of animals.

It has been suggested a negative effect of pathological processes on performance of does. Young rabbits can be affected either directly (by transmission of infection, Vörös 1980, Patton et al., 1984), or indirectly (defective maternal behaviour or dead of female, Okerman, 1983). Few studies have reported the influence of disease processes on performance of productive does. Rosell (1990) reported a higher weaned rabbits in healthy females respect to females with rhinitis, sore hocks and mastitis. Torres et al. (1986), also reported a higher mortality of young rabbits in females with rhinitis. It would be relevant to asses the effect of different disease processes on some reproductive traits in order to know better the economic repercussion in the production.

## **MATERIAL AND METHODS**

### *Animals and management*

All the animals came from a synthetic line selected on litter size at weaning. Selection was performed on estimated breeding values for litter size at weaning up to five parities.

Reproduction was organized in discrete generations, not allowing any offspring of animals of one generation to be mated with rabbits of the generations of their parents.

Data of last parity were collected from a total of 1116 reproductive females. The period of observation was comprised between April '92 and January '98. The studied traits were the order of kindling (NK), the total number of born rabbit (litter size, LS), the number of born alive (NBA) and the number of weaned rabbits (NW) at the last kindling just before culling or death. Reproductive records and the culling or death symptoms of the females were registered by the farmer. The animal exploration was visual and manual. Does were examined when matings and palpations were carried out by the farmer. The culled females without symptoms were considered healthy females. Some pathologies or symptoms showed a low number of animals, therefore they were grouped as specified in table 1. Data from culled and dead does were separated because the effect on reproductive traits could be different.

Does and bucks were allocated in individual flat-deck cages in a farm with controlled ventilation, having 16 h of light per day. Inside the farm, the temperature varied from 14 to 28 °C. Adult animals consumed a commercial pelleted diet containing 17% crude protein, 14.5% crude fibre and 3.4% crude fat. Does were fed ad libitum. All animals had free access to water. The does had their first mating when they were around 18 weeks of age. A semi-intensive rhythm was followed. Adoptions were practised after five parities

#### *Hygiene and prevention measures.*

Diseased animals were removed as soon as possible to prevent infection to the other animals. The cage was disinfected when a doe was eliminated. Hair left clinging to the cages was removed with a gas burner twice a week. Plastic grilles were used for adult bucks and does and they were cleaned frequently. As preventive treatment to Vermes, feed containing abendazol or oxbendazol was used three times a year. To prevent sarcoptic mange, the walls and ceiling were sprayed with enilconazol once a month.

The vaccination program was: myxomatosis heterologous vaccine at 8-10 weeks of age, VHD vaccine at 12-14 weeks and myxomatosis homologous vaccine at 16-18 weeks. Last two vaccinations were applied on a yearly basis.

#### *Statistical analyses*

A least squares analysis using GLM procedures of SAS (1997) was carried out. The following fixed effects were including in the model to analyse LS and NBA:

- Culling and death causes, with eleven levels (table 1).
- Generation of selection, with seven levels.
- Number of kindling, with four levels depending on the number of kindling at culling or death moment (first parity, between 2<sup>nd</sup> and 5<sup>th</sup> parity, between 6<sup>th</sup> and 10<sup>th</sup> parity, and from 11<sup>th</sup> on).
- Culling or death season, with four levels (winter, spring, summer and autumn).
- First mating age, with three levels (below 126 days of age, between 126 and 140, above 140 days).
- Lactation effect with three levels (does mated at 10 days, does mated at 17 or 24 days, does mated after 24 days after last litter. In the last case females were not lactating).

The number of weaned rabbits (NW) was analysed with the same model, but including a covariate, the number of young rabbits adopted or given up. The number of kindlings was analysed with a model including the fixed effects generation of selection, culling and death causes and first mating age defined above

## RESULTS AND DISCUSSION

The incidence of the different pathological processes can be seen in table 1. A very important number of productive does seem to be healthy when they were culled (49%). A 33% of does were eliminated by the farmer because they showed some symptoms or lesion. The remaining does (18%) died before farmer could cull them. The percentage of healthy does is higher than the result (14%) found by Torres *et al.* (1987) with 620 does belonging to four selected lines. This work also showed a higher incidence of dead does (23%)

The mayor cause of culling and death were reproductive problems, 14.8% and 4.93%, respectively. Reproductive problems were divided in two depending on the period of time between kindling and culling of the doe because the effect on reproductive traits could be different. Mummified foetus counted (represented) 40% of reproductive problems 1. Refused to mate and infertile does were another important percentage (37%) of reproductive problems 1. The respiratory and mastitis process was the next more important cause of culling, 6.6% and 6.4%, respectively. The more relevant symptoms for respiratory processes were rhinitis (45%) and abscesses (47%). On the other hand, sore hoks was one of the symptoms with less incidence, 0.68%.

Healthy does had a higher number of kindlings (10.5) in comparison to sick or dead does (from 3 to 6 kindlings) (table 2). Coudert (1978) and Rosell (1996) have found similar results. Coudert indicated that the pathologic incidence is higher during the first six kindlings with the exception of the respiratory processes, these ones appear earlier. Rosell showed a higher prevalence of rhinitis in the third kindling.

Table 2 shows the least-square means for litter traits of the pathological processes studied. The total number of born rabbit for the different pathological processes were similar or bigger than LS of healthy does. The pathological processes examined did not affect negatively to litter size. The culled does for mastitis and reproductive problems (2), as well as, the death does for respiratory processes and reproductive problems (1), showed a higher LS. It seems that does with high productivity were more susceptible to the same pathological processes. According to this, Patton (1988) suggested that the reproductive stress is associated with the development of respiratory diseases.

The results were similar for the number of born alive (NBA). The same four pathological processes above mentioned, showed relevant differences respect to healthy does (more than one young rabbit) but only culled does for mamitis and dead does for reproductive problems (1) showed significant differences. On the other hand, culled females for other processes and death females after parturition showed a higher mortinatality. Rosell 1990 also found a similar number of born alive for culled females for rinhitis and healthy females but however, this author did not find differences between culled females for mastitis and healthy females.

The effect of pathological processes was very important for the number of weaned. The sick culled females and dead females showed a lower NW than healthy females, from 2 to 4 weaned less. There were two exceptions, culled females for mastitis and culled or dead females for reproductive problems (1).

**Table 1.** Symptoms or lesions grouped by pathological processes. Incidence (%) and number of animals (n) for the pathological processes.

SYMPTOM OR LESION	PATHOLOGICAL PROCESSES	INCIDENCE (n)
<b>CULLED DOES</b>		
No Symptoms or lesions. Healthy does	No pathological processes. Healthy does	48.74 % (545)
Rhinitis Torticollis Pneumonia Conjunctivitis Abscesses	Respiratory processes	6.63 % (74)
Mastitis	Mastitis	6.36 % (71)
Refused to mate, Infertile does Abortions Mummified foetus Pregnant does die just before parturition	Reproductive problems (1)	11.56 % (129)
Metritis Defective maternal behaviour	Reproductive problems (2)	3.23 % (36)
Dental overgrowth Diarrhea Sore hocks Dermatomycosis Other causes *	Other processes	4.93 % (55)
<b>DEAD DOES</b>		
Rhinitis Pneumonia	Respiratory processes	4.03 % (45)
Abortions Pregnant does die just before parturition	Reproductive problems (1)	4.93 % (55)
Diarrhea	Diarrhea	3.94 % (44)
Females die after parturition	Females die after parturition	3.5 % (34)
No symptoms Mastitis Other causes *	Other processes	2.51 % (28)

*Reproductive problems (1): Symptoms or lesions appear in the next gestation after the last registered kindling. Reproductive problems (2): Symptoms or lesions appear in the last registered kindling.*

*(\*) Other causes like for example: very thin does, broken leg, swollen legs, twisted legs, etc....*

Does affected with respiratory processes showed 2 weaned less than healthy does according to the results of Rosell (1990) in females with coryza. The results of culled or

dead females for reproductive problems (1) were expected because the problems appear a long time after of the last registered parity and then the reproductive traits were not affected. Culled females for mastitis showed a higher NBA and a similar NW than healthy females. It seems to be a higher mortality during lactation in agreement with the results found by Rosell (1990). However, this author reported a lower number of weaned for does with mastitis respect to healthy does, the difference was almost 2 weaned rabbit.

**Table 2.** Least square means and standard errors (between brackets) of number of kindling (NK), litter size (LS), number of born alive (NBA) and number of weaned (NW) in culled and dead females for different causes.

		NK	LS	NBA	NW
	<b>HEALTHY</b>	10.5 (0.1)	9'42 (0'27)	8'09 (0'31)	7'36 (0'30)
<b>CULLED DOES</b>					
	Respiratory processes	3.1 (0.3) *	9'41 (0'42)	7'38 (0'49)	5'19 (0'48) *
	Mastitis	5.9 (0.3) *	10'66 (0'42) *	9'61 (0'50) *	7'23 (0'47)
	Reproductive 1	4.7 (0.3) *	9'16 (0'34)	7'71 (0'40)	6'53 (0'37)
	Problems 2	5 (0.4) *	10'90 (0'56) *	9'12 (0'66)	3'38 (0'61) *
	Other processes	4.7 (0.4) *	9'81 (0'47)	6'67 (0'55) *	3'68 (0'54) *
<b>DEAD DOES</b>					
	Respiratory processes	3.4 (0.4) *	10'39 (0'52) *	9'30 (0'61)	4'12 (0'58) *
	Reproductive problems1	3.9 (0.4) *	10'84 (0'48) *	9'30 (0'57) *	7'71 (0'52)
	Diarrhea	5.8 (0.4) *	10'37 (0'52)	8'45 (0'61)	4'15 (0'59) *
	Does die after parturition	5.7 (0.5) *	8'44 (0'59)	4'36 (0'68)	---
	Other processes	4 (0.5) *	9'91 (0'64)	9'56 (0'74)	4'86 (0'73) *

*Reproductive problems (1): Symptoms or lesions appear in the next gestation after the last registered kindling. Reproductive problems (2): Symptoms or lesions appear in the last registered kindling.*

\* Significant differences ( $p < 0.05$ ) respect to healthy does.

#### IMPLICATIONS

The low productivity of females with pathological problems suggests the culling of sick females, this measure could also avoid a greater diffusion of the infecto-contagious diseases

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