

RHINITIS OF THE DOMESTIC RABBIT. AN EPIDEMIOLOGICAL SURVEY DURING THE PERIOD 1992-1993. INFLUENCE OF THE SEX, THE AGE AND THE PHASE OF LACTATION

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Abstract - This paper describes the prevalence of rhinitis in adult rabbits, from a sample of 4.719 females that were examined in 94 commercial rabbitries, between January, 1, '92 to December, 31, '93, and a sample of 1.241 males that were examined at 84 units. Considering the same age, the prevalence was higher in bucks (42.87%) than in females (30.97%). Another objective of this study was to provide the percentage of sick does, according to the number of kindling (it was higher at the third one) and the phase of lactation (no significance); 50% of the females died or were eliminated after the fourth kindling. This paper also shows the structure of the population concerning 8.885 females, examined between 1989 and 1993 in 137 rabbitries, and 1.241 males, examined in 84 farms during 1992 and 1993.

INTRODUCTION

In previous papers (ROSELL *et al.*, 1992 a, b) the economical and technical importance of respiratory processes in the adult rabbits, as well as some clinical and epidemiological aspects, observed in 53.632 does examined in 435 farms, during 6 years (1986-1991), was indicated. The results of 2.752 bucks examined in 1990 and 1991, were also discussed.

The mean prevalence of rhinitis in females, decreased from 43% (1986) to 33% (1991). There were statistically significant differences in the percentage of diseased adults, considering the month of the year (highest prevalence between June and September). There were fewer diseased animals in open air rabbitries, with concrete cages. In one paper, the influence of the sex, number of kindling and phase of lactation was studied. It was demonstrated that males were more affected than females, and that the does were more distressed at the third kindling. There were no significant differences according to the production phase.

The age of the males was not specified on that occasion, therefore it can be supposed that a greater percentage of disease was due to the age. The lactation phase included only two periods: females with less or more than 15 days of lactation.

The objective of this investigation, is to make a more detailed study on the prevalence of rhinitis, with special interest on the age of the bucks and females, as well as in the day of lactation. Another purpose of this study, was to show the structure of the population in the farms.

MATERIAL AND METHODS

Two data bases have been used for this paper. The first one (A), consisted of 4719 does in lactation, randomly examined in 94 industrial farms, during 147 visits. Furthermore, 1241 males in 84 rabbitries, were examined during 114 visits. The period of observation was comprised between January '92 and December '93. The second data base (B), consisted of 4166 does, examined in the period 1989-1991, in 61 different farms. Both groups, comprised a total of 8885 females, belonging to 137 different farms, (that figure it is not the addition of 94 and 61, because there were common rabbitries in both periods). For each analysis the data base used, is specified. The size of the farms examined, was comprised between 100 and 7200 females. 55% of the farms, had between 200 and 500 does, as indicated in an other paper (ROSELL, 1996).

The epidemiological model employed for the study, was always cross-sectional. The expected prevalence of rhinitis was about 40%, according to a previous study (ROSELL, *et al.*, 1992 a). Due to a lack of manpower, the exact determination of the prevalence was not made, for example as described by ORTEGA *et al.*, 1995. The sampling of the females, was carried out by random examination of 10% of the population; for data bases A and B, the mean of females examined by rabbitry was 34. In the case of bucks, we always randomly examined 10 animals that had been used as breeders at least once.

In the sampling, only farms with records of breeders were included; in these records, the age of the animals was registered. In group A does in 94 farms were examined but, in 10 of these farms, the bucks did not had a

specified age. The animal was taken outside the cage, to examine the nose and the medial face of the forelimbs (rhinitis), the sole of the limbs (sore hocks), the inside of the external ear, the muzzle, the tail and the distal part of the limbs (mange) and, finally, in the females the mammary glands (mastitis) were examined. The exploration was visual and manual. The animals were positive or negative, and the degree of affection was not estimated. In rhinitis condition, mucus or clotty hair in the muzzle, and/or in the medial face of the anterior extremities, should be present. In the examination of 40 breeders, an average of 30 minutes was employed that, together with the other elements of a visit: conversation with the owner, observation, necropsies, recommendations, etc. makes a total of 60-90 minutes.

In all the cases, does after kindling and lactating does were examined, because during the visit, besides the examination of the females, it is important also to have information about the suckling rabbits. This causes the distribution of samples not to correspond with all the productive females on a farm. Consequently, it can be considered that there is a bias in this study, due to the fact that nulliparous does have not been examined. It is well known that a number of does disappear (dead) during the first pregnancy. The prevalence of rhinitis has only been determined on the number of present females. To complement all this information, it has been considered necessary to make a calculation of the culled does (live or dead).

In this study, the production phase of the females (number of kindling and day of lactation) has also been considered. To calculate the age of the animal, it has been considered an average of 51.8 days between kindlings (RAFEL *et al.*, 1995) and four months and a half for the age to the first matting. As there are insufficient data about the exact age of the first effective matting, there can be a small mistake in the calculation of the age of the first kindling.

RESULTS AND DISCUSSION

1. Effect of the number of kindling.

In Table 1 the basic statistics for group A, that defines the distribution of values observed for the number of kindling, is presented. A great dispersion is observed, to the 32th kindling in some exceptional does, with a mean of 5.63.

Table 1 : Basic statistics for the number of kindling.

Source	Result
Frequency	4,719
Mean	5.63
Median	4
Standard error	0.06
Standard deviation	4.39
Maximum	32

Elimination according to the number of kindling - The structure of the female population in groups A and B, referred to the number of kindlings, is presented in Table 2. In both cases, the females found according to the number of kindling and the day of the visit in, respectively, 61 and 94 different farms, is indicated. It is also included the percentage of present does in each kindling, in absolute frequency and in percentage related to the expected value, if no female had been eliminated. In group A, 24.34% of the females reached the 10th kindling, and in group B, the percentage was 23.26%. It seems that the trend in both groups is uniform.

Table 3 shows the total results of 137 farms and 8885 does. In addition to the absolute values, there are the percentages of does that disappear, live or dead, after a kindling (relative and cumulative). The percentages of females present in a particular period of time, for each kindling, referred to the total of females examined (8885 does), are also presented.

The results of the table include the percentages of culled does (live plus dead), relative and accumulated, after a kindling. Taking into account the deviation, the trend of both groups, the period of the study, and the number of farms studied, the following things can be stated:

- The percentage of females that does not reach the fourth kindling, is 30%.

Table 2 : Distribution of present females per kindling.

Kindling	1989-1991 - 61 rabbitries		1992-1993 - 94 rabbitries	
	Does n	% Present	Does n	% Present
1	649	100%	682	100%
2	618	95.92%	641	93.98%
3	526	81.05%	558	81.81%
4	436	67.18%	515	75.51%
5	368	56.70%	390	57.18%
6	304	46.84%	376	55.13%
7	237	36.51%	287	42.08%
8	232	35.74%	258	37.83%
9	199	30.66%	213	31.23%
10	151	23.26%	166	24.34%
>10	449	0	633	0
TOTAL	4,166	-	4,719	--

Table 3 : Relative and cumulative frequencies of eliminated does and present females for each kindling.

Kindling	Does n	137 Rabbitries		8,885 Does
		% eliminated relative	% eliminated accumulated	% present
1	1,331	0	0	100
2	1,259	5.41*	5.41	94.59
3	1,084	12.95	18.36	81.64
4	951	10.19	28.55	71.45
5	758	14.50	43.05	56.95
6	680	5.86	48.91	51.09
7	524	11.72	60.63	39.37
8	490	2.55	63.18	36.82
9	412	5.86	69.09	30.91
10	317	7.14	76.18	23.82
>10	1,082	23.82	100	0
Total	8,885	100	--	--

*Does eliminated after the first kindling and before the second one.

Table 4 : Prevalence of rhinitis in does and relative frequency of eliminated

Kindling	Does n	Prevalence (%)	% eliminated relative
1	682	26.10	--
2	641	34.63	6.02*
3	558	37.10	12.16
4	515	32.23	6.30
5	390	27.44	18.33
6	376	28.19	2.05
7	287	24.04	13.05
8	258	27.91	4.26
9	213	29.11	6.60
10	166	27.11	6.89
>10	633	34.60	24.34
TOTAL	4,719	30.79	100

*Eliminated after the first kindling and before the second one.

Table 5 : Basic statistics for the parameter day after kindling.

Source	Results
Frequency	4,719
Mean	16.79
Median	17
Std. Error.	0.14
Std. Dev.	10.02
Maximum	53

of 16.79 days. Table 6 presents the prevalences of rhinitis, as a function of the week of lactation. The percentage of diseased does is not influenced by the week of lactation. The value of the Chi² of independence is 6.53 (p=0.25). These results are in accordance with those of a previous study (ROSELL *et al.*, 1992 b).

Effect of the age of the male

Table 7 presents the basic statistics that define the distribution of values observed for the age of the bucks examined, expressed in months.

- The median of the population is located at the 4th kindling, or in 10 months and a half of life, which represents 6 months of productive life.
- In the group examined in years 92 and 93, a 45% of the does had more than a year of life, or 5 kindlings, and only a 8% had more than 2 years, or 12 kindlings.

In the group of does examined during the period 1992-1993, it is possible to observe a slightly positive tendency to the longevity if compared to the 1989-1991 period. It is evident that, once the epidemiological information is contrasted and the risk factors involved in the death and precocious elimination of females are known, it has been made an effort to improve the useful life of the does, and, in fact, the benefits of the rabbit producers.

Prevalence of rhinitis in function of the number of kindling - The prevalence of rhinitis in the group of 4719 does, examined during the years 1992 and 1993 (30.79%), was lower than the one observed for the group of years 1989-1991 (35.39%). However, the distribution as a function of the number of kindling, was very similar, as can be seen in Table 4, with a maximum in the third kindling. In this investigation, the prevalence was found to be dependent on the number of kindling; the value of the Chi² was 38.43 (p<0.001). In this table an evident relationship between the prevalence of rhinitis and the elimination of females is observed, with a maximum between the second and the fifth kindling, something which can be due to the level of fatigue or to the stress of the does. The respiratory pathology is the cause of an important degree of mortality in does (ROSELL, 1996), and it would be interesting to demonstrate their influence on the mortality levels and elimination in function of each kindling.

Effect of the phase of lactation

The basic statistics that define the distribution values observed on the lactation phase, are presented In Table 5. It is possible to see a great degree of dispersion, with a maximum of 53 days post-kindling, and a mean value

Table 6 : Effect of the week of lactation on the prevalence of rhinitis.

Week	N	Prevalence (%)
1	1,066	32.83
2	978	30.27
3	1,001	30.17
4	952	30.78
5	626	28.15
6	96	37.50
TOTAL	4,719	30.79

previous observations (ROSELL *et al.*, 1992 b), in which the bucks were more affected than the females. In the present study is demonstrated that the prevalence is greater at similar ages.

The mean prevalence of rhinitis in data base A was 42.87 %, greater than the prevalence observed in a previous study (35.24 %), with 2752 males examined during the years 1990 and 1991. It would be necessary to confirm this tendency with a more observations in the next years. Furthermore, it can be emphasized in this study that the oldest bucks are more affected than the young ones, in spite of the fact that the renovation rate is similar to that of the females. The explanation for this can be associated with the physiology of the male, with the management (promiscuity) or with a deficiencies in hygiene.

In this study some bucks that were matting at 4 months of age have been detected , though in Spain, is usual to begin at 5 months of age. The average of females matted per buck and month, was 7 (ROSELL and PIREZ, 1995). The median of the studied population was 13 months of life, that is to say 8 months of production.

Figures 1 and 2 show the structure of the population of females and bucks, respectively, for data corresponding to 1992 and 1993.

The structure of the population of the 4719 does examined in years 92 and 93 (group A), compared to the 4166 does of the years 89, 90 and 91 (group B), shows a slight trend to longevity. In a next study, it would be interesting to compare the two data bases with a third one, globally, or only referred to common farms in all the periods.

It is obvious that one of the main objectives in the rabbitries is to obtain the greater production by female (and lower cost), for each kindling and for the complete life cycle of the animal. In a next data base, it would be interesting to introduce other variables, as the breed, nutrition and reproductive rate. The control of the mortality of the does, is a high-priority objective to improve the economy of the rabbit producers.

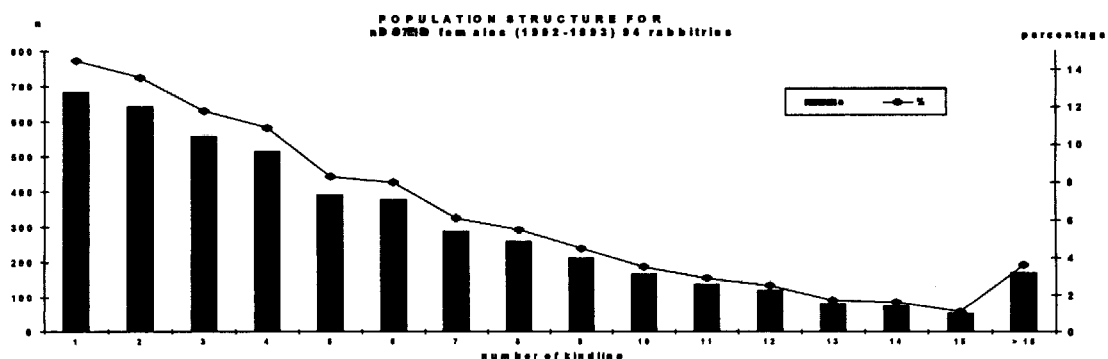
The prevalence of rhinitis is influenced by the age of the males, since meaningful differences between the four age categories, that are presented in Table 8 are observed; the value of the Chi² of independence is 7.66 (p<0.05). These results also confirm

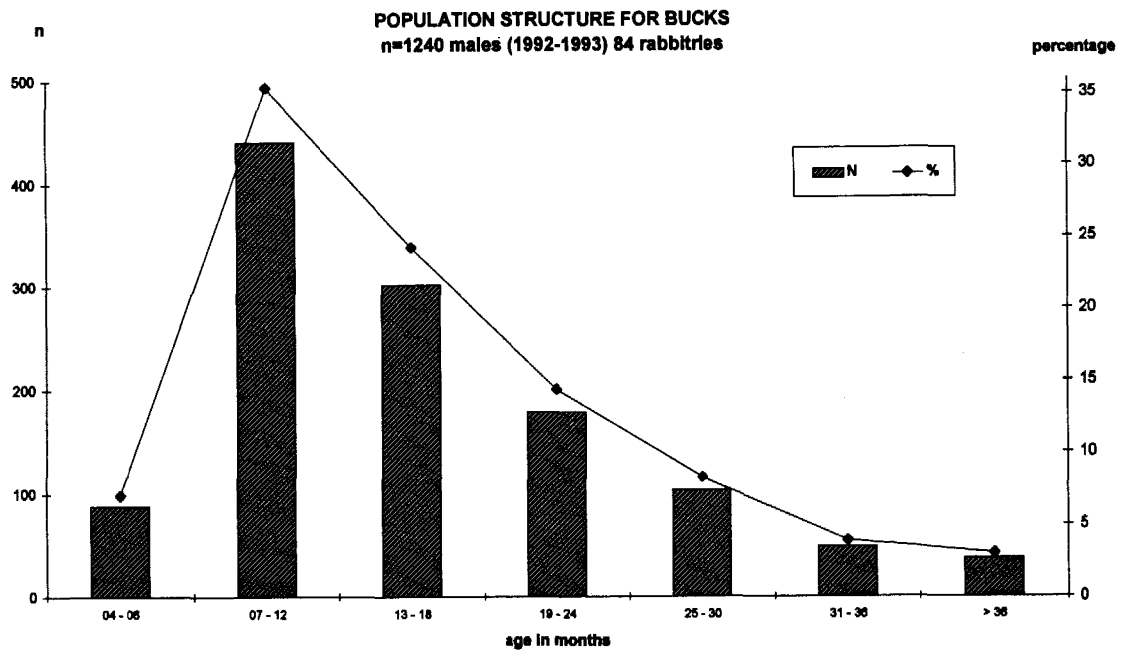
Table 7 : Basic statistics for prevalence of rhinitis and for the parameter age of the males.

Source	Results
Frequency	1,241
Mean	15.78
Median	13
Standard error	0.25
Std. Deviation	8.89
Minimum	4
Maximum	69

Table 8 : Prevalence of rhinitis in males, according to the age.

Age (months)	N	Prevalence (%)
04-12	574	40.24 +-2.04
13-24	479	44.05+-2.26
25-36	151	44.37+-5.43
37-69	37	62.16+-7.97
TOTAL	1,241	42.87+-1.40





CONCLUSIONS

- The prevalence of rhinitis in the does was smaller in the period 1992-1993 (30.79%), as compared with the three previous years (35.39%).
- The prevalence is related to the number of kindling, reaching a maximum in the third one, and is independent of the week of lactation.
- The prevalence of rhinitis in the males is greater than in the females with similar ages: 42.87% and 30.79, respectively. In males, the prevalence is increased with age, and in females it is not.
- In females, the median of the population is located in 4 kindlings (10 months and a half of life or 6 months of production). In bucks the median is located in 13 months of life or eight months of production.

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