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PRODUCTION OF FEMALE RABBITS AS A FUNCTION OF AGE

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In the breeding of domestic rabbits, as in the case with all profit animals, it is a basic requirement that the animals be able to produce, at a high level and for a long time. With breeding stock of high breeding value it is particularly important, that the active period should be as long as possible, since the breeding value of female rabbits is judged after a 3 to 6 month breeding period and they can be taken into account as breeding stock only after that. Naturally, it is not indifferent, from the economic point of view either, how long a production period will carry the costs of rearing. On the other hand, it is reasonable to expect these females to have, besides excellent maternal traits a good constitution and resistance against harmful enviromental effects.

Materials and Methods

The examinations were carried out at the rabbit farm of the Research Centre for Animal Breeding and Nutrition with two New-Zealand White /"H" and "G"/ and one Californian /"K"/ lines. From each line 45 females were selected which had been in production for at least 24 months. The females were first mated at the age of 5 to 6 months and bred again 10 days after delivery. Females were kept in two closed sheds heated in winter, in battery-systems of one and three levels. Granulated breeding rabbit concentrate was fed ad lib, water was provided in value-drinkers.

Data on the time of matings and deliveries, litter size at birth and 21 days of age, as well as litter liveweight gain up to 21 days, gained from the stock-records, was

arranged according to time spent in production. Summarized results of the three lines were finally graphically represented.

Results

Relationships between the age and production traits of female rabbits are shown on the graphs of figure 1. and 2.

- Litter size

  Smallest litter sizes at birth /7,44 and 7,42/ and at 21 days of age /6,18 and 5,39/ were noted in the first and second months of production, i.e. at first delivery. Following the first, lower performances, litter size at birth increased above 8,5 and at 21 days above 7,0. Maximum performance was reached between the 4th and 6th months by the Californian stock, while the two New-Zealand White line /"H" and "G"/ reached it between the 6th and the 5th and 10th months, respectively.
  Following the 10th to 12th month of production a pronounced decline was experienced, particulary in litter size at 21 days. Performance of females in production for two years dropped almost to the level of the 1th and 2nd months.

- Litter weight gain

  Milk production of does is estimated on the basis of the weight gain of the litter up to the age of 21 days. Accordingly weight gain values give information on milk production as well.
  Concerning this trait, it was also the first two months where the lowest values were gained /1578 and 1449 g/. Between the 5th and 11th month the figures were above 1900 g, then, with advancing age, litter weight gain definitely decreased, below 1750 g in the 17th month.
  Tendencies were, with all the lines, very similar. Californian line proved to be more obviously weaker milker.

- Individual body-weight at the age of 21 days

21 day body-weight of sucklings showed a steady increase with the advancing age of their mothers. In the first half of the year values were around 320 g, progeny of females 7 to 14 months in production attained a body weight of about 330 g, while sucklings of still older females reached a liveweight of 340 g or more.
It may appear a contradiction that individual body-weight kept on growing even when milk production was showing a declining tendency. The explanation is, that the decrease in 21 day litter size is, proportionally, greater then that in litter weight gain, thus the quotient of the two figures, the quantity of milk produced falling to one suckling, kept growing.

- Suckling mortality

Suckling mortality was devided into two parts: dyings off of complete litters, and individual dyings in the suckling period. The rate of dying of complete litters was 25,7 percent in the first month, and it was between 14,8 and 13,9 percent in the 2nd to 4th months too. In the 5th to 20th months, excepting three cases, it dropped to a value under 10 percent. In the 5th, 7th and 13th months 5,1, 5,2 and 5,7 percent of the litters perished and in the 15th month none. From the 20th month the number of perished litters grew again.
Mortality during the suckling period, excepting the values 23,8 percent of the 2nd and 19,5 percent of the 11th months, was level between 13,3 and 16,6 percent. With mothers longer in production it often crept above 20 percent, reaching 30,2 percent in the 18th month and 26,4 in the 22 nd.
Total suckling mortality, a summary of above two components, was rather high in the first two months and then again, from the 17th month on. In the intermediate period suckling losses ranged between 18,4 and 30,3 percent,

without any definite tendency.

Discussion

A comparison of results found in publications to our own was made difficult by the fact that Rouvier et al. /1973/, Matheron and Rouvier /1978/, Broeck and Lampo /1975/ and Leplege /1969/ all evaluated their results on the basis of the sequence of deliveries while ourselves made our examinations into the production traits of female rabbits on the basis of the number of months in production. Grouping according to age seemed to be reasnable, because previous foreign research unequivocally demonstrated that it is the age of female that effects, primarily, production traits and not the sequence of deliveries. With this method the effect of the frequency of deliveries can also be eliminated. In spite of above differences in methodology it can be established, that litter size at birth and at the age of 21 days were equal or similar between the foreign and own results. A theoretical explanation of the lower performance of does with their first litter and older animals is given by Hulot and Matheron /1981/.

Liveweight gain of first litters, as was found in the research of Kalinowski and Rudolph /1975/ concerning milk production, is considerably lower than that of later litters. As above authors traced milk production only up to the 4th delivery, they could not possibly observe that after 11 months in production litter weight gain /i.e. mil production/ is strongly reduced.

According to our examinations, individual body-weights at 21 days show a marked increase with the advancing age of does. This contradicts the results of Broeck and Lampo /1975/ according to which the serial number of delivery has no effect on the body weight at weaning.

In accordance with references in literature, the mortality of sucklings in the first two months /first deliveries/

was higher /Coudert, 1982; Delaveau, 1979/. Broeck and Lampo /1975/ reported that the suckling losses, from the 9th delivery on, increase again to above 50 percent. In our case this happened in the 17th month, which corresponds to the 8th or 9th delivery of females.

A separate analysis of total litter losses and mortality in the suckling period demonstrated that while loss of total litters increased only from the 20th month on, suckling mortality became heavier as early as in the 13th month. A decrease in milk production can be a partial explanation of latter result.

Conclusions

On the basis of the relationship between age and production of female rabbits, the following conclusions can be drown:

- On the basis of traits examined it can unequivocally be established, that the performance of females at first delivery is way below average.
- Females reach their maximum performance between the 4th and 12th months.
- Litter size at birth and at 21 days of age decreases steadily after the 10th month in production.
- Sucker-period-mortality starts increasing after the 13th, total litter losses after the 20th month.
- Individual body-weight at 21 days increases with the advancing age of the doe.
- On examining various production traits differences were found between the Californian and the New-Zealand White lines, which indicates that different genotypes react to the effect of age in a different way.
- On the basis of the relationship between age and production of females no recommendation can be made for culling age. In spite of the general tendencies, individuals capable of exceptionally high performance can be found even among females two years in production. The time for

culling can only be determined on the basis of individual assessment.

- Selection of females is usually done on the basis of 3 to 4 deliveries, giving preference to individuals showing high production at an early age. Especial attention should be paid to females capable of exceptional performances at an advanced age too. At the same time, to lay the fondations of a high life-time performance in the stock, as many progeny should be reared from them, for production, as possible.

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Summary

In the experiment two-year-production of 45-45 altogether 135, females of two New-Zealand White and one Californian line was examined. In the first two months, average litter size at birth was 7,44 and 7,42, at 21 days 6,18 and 5,39, litter weight gain to 21 days 1578 and 1449 g, rate of total litter loss 14,5 and 23,8 percent. Females in production for 4 to 12 months gave biggest performances with the following maximum values, in the sequence of traits examined: 9,03 and 7,55, 2068 g, 0,0 and 13,3 percent. Litter size at birth and at 21 days as well as litter weight gain up to 21 days of age started to decrease from the 10th months. Suckling mortality increased from the 13th, total litter losses from the 20th months. In the 24 months examined 21 day individual body-weight increased from 315 g to 345 g.

Résumé

Au cours de l'expérience on a examiné la production des lapines provenant de deux lignées néo-zélandaises blanches et d'une lignée californienne, comptant chacune 45-45, en tout 135. Dans les deux premiers mois le nombre de portées moyen á la naissance était 7,44 et 7,42 au 21^{e} jour le nombre de portées 6,18 et 5,39, la croissance en poids de portées atteinte jusqu'au 21^{e} jour était 1578 g et 1449 g, le pourcentage de la mortalité totale 25,7 % et 14,8 % et la mortalité pendant la durée de l'allaitement était de 14,5 % et 23,8 %. Les lapines produisant pendant les 4-12 mois ont atteint la plus grande production, selon l'ordre des propiétés avec les valeurs maximales suivantes: 9,03, 7,55, 2068 g, 0 %, 13,3 %. Le nombre de portées de la naissance et celui du 21^{e} jour, ainsi que la croissance en poids atteinte jusqu'au 21^{e} jour ont diminué á partir du 10^{e} mois. La mortalité pendant l'allaitement a augmenté au 13^{e} mois et la mortalité de la portée totale au 20^{e} mois. Pendant les 24 mois examinés le poids de corps individuel de 21 jours a augmenté de 315 g á 345 g.

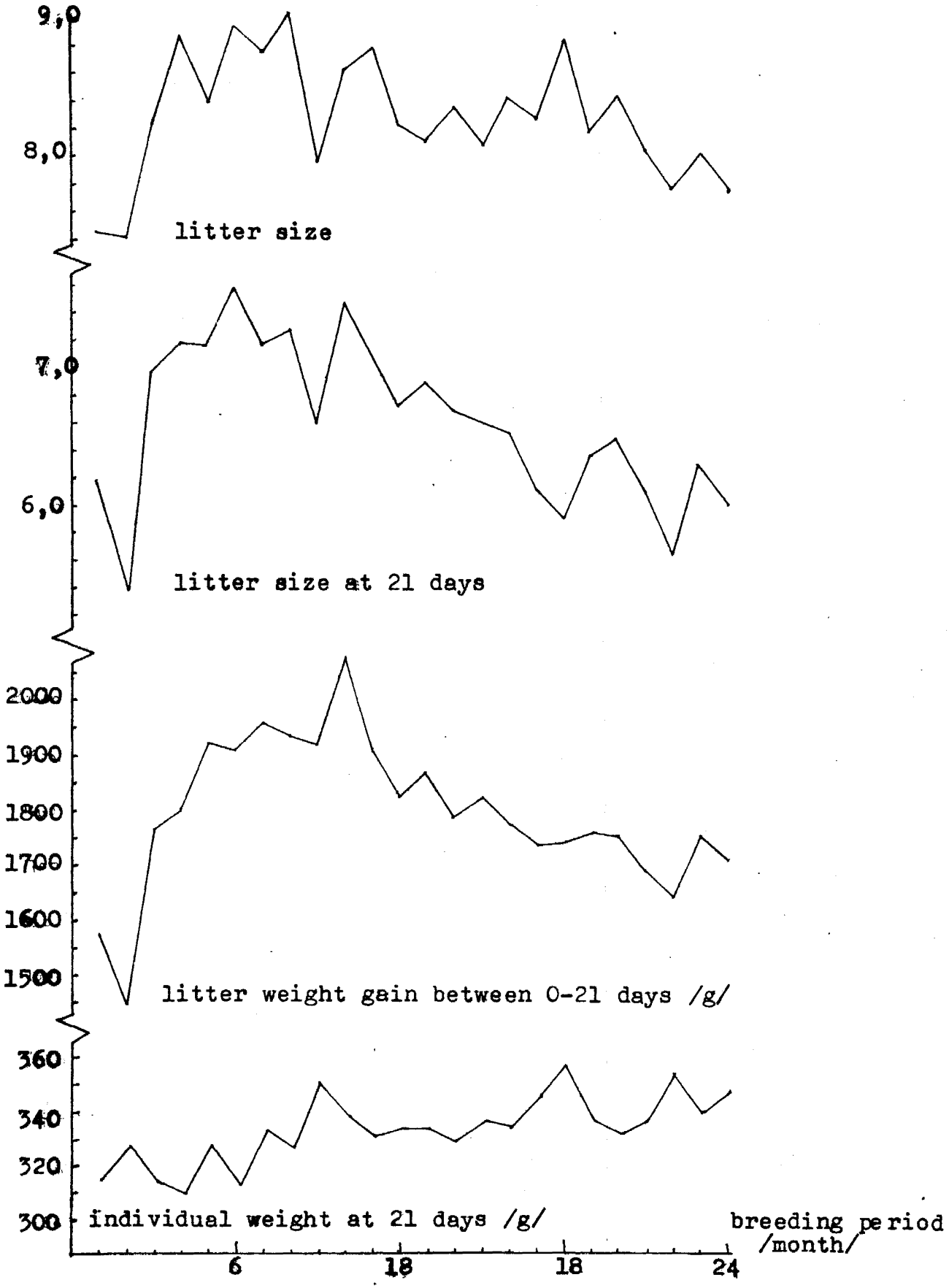

Figure 1. Effect of age on some production traits of does

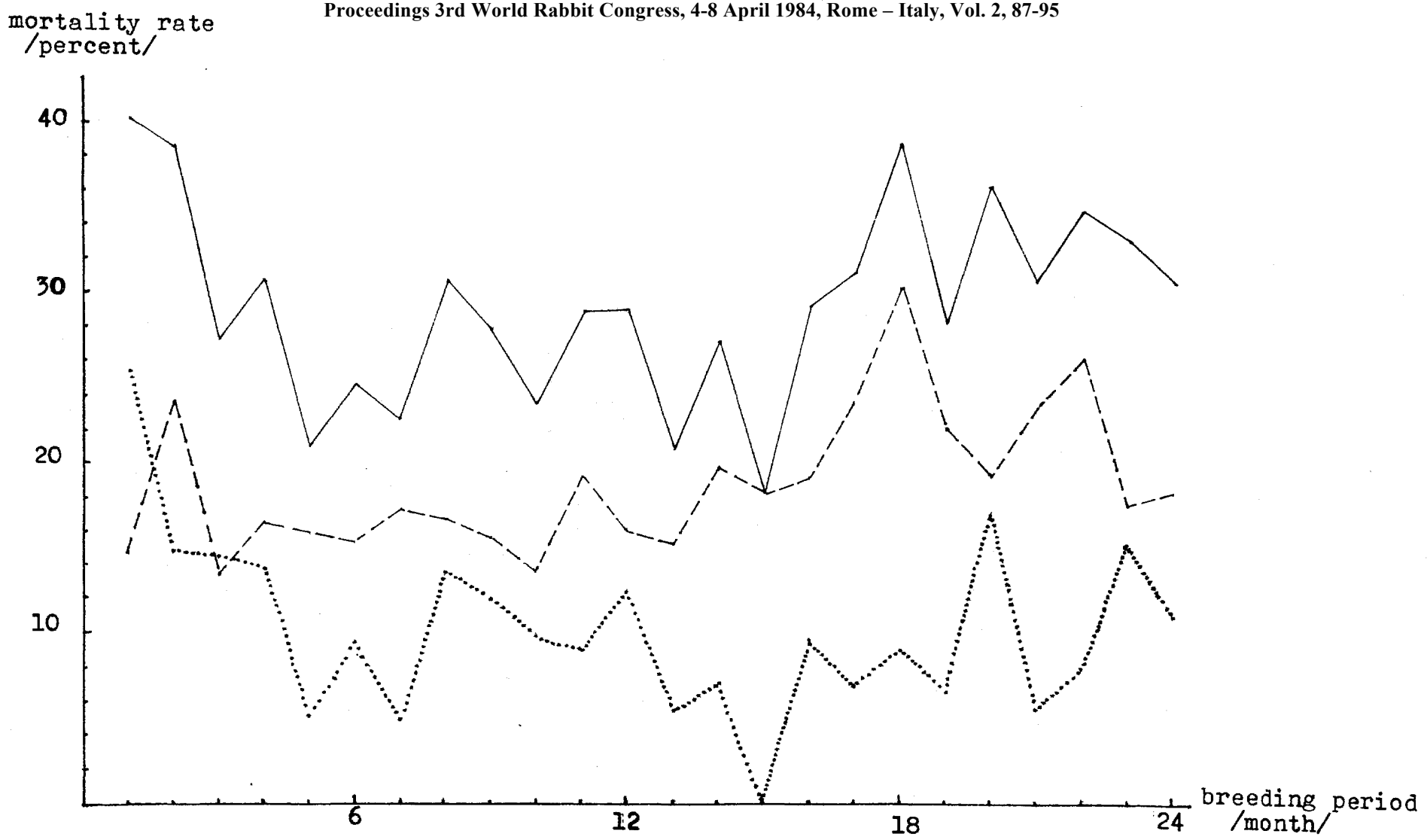

Figure 2. Suckling mortality depending on age of does

—— total suckling mortality
--- suckling mortality
····· total litter loss