

RELATIONSHIP BETWEEN THE NUMBER OF MAMMARY GLANDS AND THE
PRODUCTION OF FEMALE RABBITS

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Production traits of does can be judged on the basis of the performance at one or more litterings. When first breeding, it is only the production data concerning mother, grandmother, full- and half sisters that can be used in the assessment of breeding value and these, in themselves do not provide the necessary informations. Accordingly, the attention of breeders often turns to the number of teats /mammary glands/ of female rabbits, trusting they may carry out a preliminary selection on the basis of it. Though the importance of the number of mammary glands is often written on, there are hardly any publications to be found on actual research into the question. That was what made us to investigate into the relationship between the number of teats and a few maternal traits /litter size at birth and at 21 days, mortality in the suckling period, live weight gain of the litter up to the age of 21 days/.

A survey of relevant literature

According to the view generally held, a female rabbit should have teats at least as many as young to suckle. Niedzwiadek et al. /1979/ investigated into the number of active teats of female rabbits. Values of females with their first litter were widely dispersed /2-9/. At later deliveries variability decreased, from among mothers in their fourth lactation 58 per cent had six and 42 per cent eight active mammary glands.

Remarkable are the findings of Szendrei /1967/, according to whom to a total milk production of 209,3 g the first

pair of teats contributed 48,9, the second 49,5, the third 46,1, the fourth 36,8 and the fifth pair 28,0 grammes. Sucklings, younger than 10 days were divided into two groups /well developed, underdeveloped/ and their placement while suckling was observed. Of the well developed group 50 per cent, of the underdeveloped group only 25 per cent would suck from the first two pairs of teats, while the same index, concerning the fifth pair was 5 and 25 per cent respectively. With young above the age of 20 days the difference was even greater, 75 per cent of the well developed sucklings were placed at the first two pairs of teats, with 5 per cent of the underdeveloped, while the values at the fifth pair were 5 and 65 per cent. According to his observations exchange of teats, at the beginning, was 25 to 30 per cent which, between the 10th and 20th day of age, decreased to 8 to 12 per cent.

Material and method

The examinations were carried out at Gödöllő, the rabbit farm of the Research Centre for Animal Breeding and Nutrition with one Californian /K/ and two New-Zealand White /H and G/ lines. The number of females examined per line was 121, 105 and 75 respectively. They had been in breeding for 1 to 18 months previously. The number of active mammary glands was taken between the 20th and 25th day of suckling. At that time, on the basis of surrounding hair drenched with milk, it was easy to establish whether or not the teat in question produces milk.

Within the respective lines the distribution of the number of teats was examined and the production of females having 8 or 9 or 10 mammary glands.

Results

Only an insignificant fraction of the stock examined had mammary glands less than 8 in number /2.4 per cent/

or more than 10 /0,3 per cent/. /See table 1/. Fewest females with 8 teats /40,5 per cent/ were found in line K, the greatest number in line G /66,7 per cent/. The number of females with 9 teats was near-equal in lines K and H /28,1 and 28,6 per cent respectively/, the same in line G was slightly less /22,7 per cent/. Females with 10 teats were most frequent in line K /28,9 per cent/, same with line H was nearly 10 per cent less, while in line G the proportion was not more than 10,6 per cent. Deviation of the distribution of the number of mammary glands between lines was, at the level $P > 2,5$ per cent, significant.

Main production indices of females are given in table 2.

Females of 10 teats surpassed those with 8 in litter size at birth by 4,4 to 15,3, and in litter size at the age 21 days by 10,0 to 20,0 per cent. Suckling mortality was also more favourable with females of more mammary glands. Comparing mothers with 8 and 10 teats a difference of 3,9 to 7,5 per cent was found.

In the litter live weight gain of the groups, used for the assessment of milk production, no telling difference was found. Only between the females of 8 and 10 teats of line H was there, at the level of 5 per cent, a significant difference, but the fact that between the 21 day's litter size of the two groups there was a difference of 1,25 may play an essential part in that. It is well known that litter weight gain greatly depends on litter size.

Evaluation

Of the population examined 97,6 per cent had 8 or more active mammary glands. The figures are much more favourable than those reported on by Niedzwiadek et al./1979/. Great deviations were experienced in the distribution of the number of teats in the various lines /genotypes/, e.g. in line K 28,9, in line H 19,1 and in line G 10,6 of the females had 10 mammary glands.

In the comparison of the production of mothers of differing number of teats it is conspicuous that the litter size at birth, of females with more teats, is essentially, many times significantly, bigger than that of females with fewer teats. The direct reason of the differences between the groups can not be the number of teats, as it is insignificant at the time of delivery. It is presumable, however, that the bodily construction of females with more teats is different, their trunk is longer, elongated, and the size and disposition of the sexual organs /first of all that of the womb/ is more favourable. Above supposition, naturally, is in need of experimental verification.

Of mothers with more mammary glands fewer sucklings died off. That is why litter size at 21 days showed even bigger differences than at birth. The bigger number of teats, presumably, has a favourable effect on viability because thus, young born with a smaller body weight get mammary glands which, though at a lower level, still produce milk /Szendrő, 1967/. Accordingly, the probability of dying of starvation is smaller.

The number of teats seems to have no effect on the milk production of females. On the basis of the findings, the conclusion that the total quantity of glandular tissue /and the production/ doesn't change with the number of glands.

Conclusions

Findings show, that mothers with 10 teats can rear as much as 10 to 20 per cent more young than those with 8 teats. This is a considerable difference which justifies giving preference to males and females of more numerous teats in selection.

Research with other species /swine, mink/ shows that the heritability of the number of mammary glands is low. This means, that from breeding stock of 10 teats, 8 and 9

teat progeny can also be expected to a measure decreasing according to the decrease in $/h^2/$ values. Which, again, means that singling out 10-teat-animals should be carried out from generation to generation.

Literature

1. Niedzwiadek, S. - Kawinska, J. - Tuczynska, J.: Roczn. Nauk. Zootec., Warszawa, 1979. 6.1. 109-115.p.
2. Szendrei M.: Házinyúl és prémesállatteny. hiroadó, Budapest, 1967.6.

Summary

The number of mammary glands was investigated into with one Californian and two New-Zealand White lines. The proportion of females of 8 or 9 or 10 teats, in the three populations, was 40,5, 28,1 and 28,9; 47,6, 28,6 and 19,1; 66,7, 22,7 and 10,6, respectively. Out of the 301 females two had 6, five had 7 and one had 11 teats. Comparing the production of mothers with 8 and 10 mammary glands, the following figures were gained: litter size at birth: 8,45-8,82, 7,67-8,84 and 8,20-8,79; litter size at 21 days of age: 6,60-7,26, 6,19-7,44 and 6,33-7,00; mortality of sucklings 0 to 21 days: 28,0-21,5, 23,9-18,8 and 29,5-25,6.

The pairs of figures clearly indicate that the production of females with 10 teats was better. The differences between groups were, in several cases, significant. Contrary to above traits, in litter weight gain to 21 days no considerable difference was found.

Résumé

Nous avons examiné le nombre de tette des femelles chez les effectifs californien et le blanc Nouvelle-Zéland. Dans les trois effectifs la proportion des femelles ayant

de 8, 9 et 10 tettes a atteint respectivement 40,5, 28,1 et 28,9; 47,6 et 19,1; 66,7, 22,7 et 10,6 p.c. Parmi les 301 femelles deux avait 6, cinq avait 7 et une avait 11 tettes. Chez les trois effectifs on a comparé la production de lapines qui avaient 8 et 10 tettes en recevant les résultats suivants: la population litée de naissance: 8,45-8,82, 7,67-8,84 et 8,20-8,79; la population de 21 jours 6,60-7,26, 6,19-7,44 et 6,33-7,00; la mortalité de lactation entre 0-21 jours qui s'est fait 28,0-21,5, 23,9-18,8 et 29,5-25,6.

En vertu de suite de nombres on peut voir que les femelles ayant 10 tettes avaient fait une production plus grande. La différence parmi les groupes s'est révélée significative dans plusieurs cas. Dans l'accroissement de la masse litiere obtenue jusqu'aux 21 jours on n'avait pas réussi de trouver une différence significative.

Table 1.

Distribution of number of teats as per line

| Denomination | Number of teats | | | | | | Total | Average pcs. |
|-----------------------|-----------------|-----|------|------|------|-----|-------|--------------|
| | 6 | 7 | 8 | 9 | 10 | 11 | | |
| <u>Line-K</u> | | | | | | | | |
| Number of animals | - | 2 | 49 | 34 | 35 | 1 | 121 | |
| Distribution /per c./ | - | 1,7 | 40,5 | 28,1 | 28,9 | 0,8 | 100 | 8,87 |
| <u>Line-H</u> | | | | | | | | |
| Number of animals | 2 | 3 | 50 | 30 | 20 | - | 105 | |
| Distribution /per c./ | 1,9 | 2,8 | 47,6 | 28,6 | 19,1 | - | 100 | 8,60 |
| <u>Line-G</u> | | | | | | | | |
| Number of animals | - | - | 50 | 17 | 8 | - | 75 | |
| Distribution /per c./ | - | - | 66,7 | 22,7 | 10,6 | - | 100 | 8,44 |

Table 2.

Relationship between number of teats and production

| Denomination | Number of teats | | | | | |
|-------------------------------|---------------------------------|-------|-------------------------------|-------|---------------------------------|-------|
| | 8 | | 9 | | 10 | |
| | X | s | X | s | X | s |
| Litter size at birth | | | | | | |
| Line-K | 8,45 | 2,39 | 8,10 ^b | 2,66 | 8,82 ^b | 2,10 |
| Line-H | 7,67 ^{c_{1,2}} | 2,47 | 8,56 ^{c₁} | 2,06 | 8,84 ^{c₂} | 2,16 |
| Line-G | 8,20 | 2,55 | 8,47 | 1,88 | 8,79 | 1,98 |
| Litter size at 21 days | | | | | | |
| Line-K | 6,60 ^{a₁} | 2,21 | 6,61 ^{a₂} | 2,54 | 7,26 ^{a_{1,2}} | 2,18 |
| Line-H | 6,19 ^{c_{1,2}} | 2,23 | 7,17 ^{c₁} | 2,27 | 7,44 ^{c₂} | 2,18 |
| Line-G | 6,33 ^c | 2,18 | 7,17 ^c | 1,51 | 7,00 | 1,77 |
| Suckling mortality /per cent/ | | | | | | |
| Line-K | 28,0 | | 22,5 | | 21,5 | |
| Line-H | 23,9 | | 19,4 | | 18,8 | |
| Line-G | 29,5 | | 18,1 | | 25,6 | |
| Litter weight gain /g/ | | | | | | |
| Line-K | 1566 | 459,5 | 1549 | 462,6 | 1614 | 447,1 |
| Line-H | 1668 ^a | 519,5 | 1706 | 497,3 | 1812 ^a | 482,3 |
| Line-G | 1705 | 509,7 | 1699 | 422,7 | 1696 | 434,9 |

Note: at level a = P > 5 per cent b = P > 1 per cent c = P > 0,1 per cent deviation is significant

