

Progress in area of reproduction in a specialized line of rabbits.

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Abstract

The experimental material included 400 White New Zealand rabbit females and 160 males divided into 3 groups (lines N-1 and N-2). In each line, selection breeding considered 2 groups of traits: reproduction and fattening. Reproduction included: the number of rabbits born per litter, the number of rabbits weaned per litter, the percent of matings needed for pregnancy, and the time from the first mating till the third litter. In this area there was considerable progress. In N-1 the number of young per litter increased by 14,7% and in N-2, 17,2%. The number of young weaned increased in N-1 by 18.0%, and in N-2, 20,6%. Mating efficiency rose by 15,3% in N-1 and by 16,7% in N-2. The time which lapsed from the first mating to the third litter was shortened by 12 days in N-1 and by 19 days in N-2.

Rabbit production in Poland developed well at the beginning of the 1970's and 1980's. However during the mid'80's production dropped rapidly. This was due to a generally difficult situation through the country. Recently interest in rabbit production is reawakening. Further rabbit production for meat in Poland requires genetic improvement through breeding.

In countries where rabbit production is well developed, research on improving breeding value is done on offspring under test station conditions [8,13]. In Spain, where the structure of production is similar to that in Poland, selection breeding is based on selection indices [3,11].

In many countries over the past few years, research has been

carried out on creating a specialized meat breed of rabbits [2,3,5,14]. Recognizing that such a specialized breed is needed, research was also undertaken in Poland by the Institute of Animal Science.

Materials and methods

The experiment was carried out on the rabbit farm of the Institute of Animal Science Research Station in Chorzele. The experimental material included 400 White New Zealand female rabbits and 160 males. After pedigree analysis, 2 lines of rabbits were formed, with 200 females and 80 males per line. In each generation from 580 to 592 litters were examined in both lines.

selection breeding evaluated the following 2 groups of traits: reproduction and fattening. Reproduction traits included the total number of rabbits per litter and the number of rabbits weaned.

In each generation a female was used for one year, starting with the first mating. With the third litter all females were evaluated for utility. These formed the test herd. Utility was based on: body weight at weaning, body weight after fattening and the amount of feed per kg weight gain. From each generation 100-120 males were evaluated and approximately 550-540 females. After evaluation males and females were selected for the future breeding herd. When the animals were 4-months-old the mother herd was selected. Females were mated between 10 and 16 days after giving birth. The young were weaned when 32-35-days-old.

All animals were raised under the same conditions: brick buildings with a regulated microclimate. The animals were fed a granulated mixture of constant ingredients. The reproduction herd was fed from 120 g granulated mixture while sexually inactive to 250g during lactation. All animals had constant access to drinking water (automatic watering-sucking).

A total of five complete generations was analyzed, including selection differences between generations. The following report presents reproduction results.

Results and discussion

Reproduction indices for females from the N-1 line were somewhat higher than from N-2 (tab.1). The difference for rabbits both born and reared in a litter was 0.2. In the F_5 generation there was considerable progress in both lines. In the N-1 line it was for those born in litter 1.0 rabbit which was a 14.7% increase in comparison to the beginning generation (P). For the number of weaned rabbits in a litter the improvement was higher and was 1,1 rabbits, a 18.0% increase over the beginning generation (P).

In the N-2 line even greater increases occurred. The number of animals per litter was 1.2 rabbits; a 17,2% increase over the beginning generation (P). The number of weaned rabbits increased to 1.3 rabbits per litter; a 20,6% increase over the beginning generation.(P).

The variance coefficients for both reproductive traits and lines ranged from 14,7 to 20.6%. In both lines and in each generation the variance in the number of rabbits at weaning was lower by 2 to 4%. The variance coefficients did not lessen in the successive generations.

Essential traits of reproduction are the percent of successful matings as well as the number of days from the first mating to the 3rd litter (tab.2). As can be seen from the table the percent of successful matings in the F_5 generation rose to 78.6%. In comparison to the starting generation (P) this was a 15.3% increase. In the N-2 line improvement was higher and was 16.7% greater than in the starting generation (P). Taking into consideration that the environmental conditions were constant the improvement can be considered as high.

There was also progress in the area of the amount of time needed to obtain 3 litters. In the N-1 line the number of days needed was 134 days, while in the F_5 generation, 122 days. This was a 9% improvement, i.e. 12 days less. In the N-2 line there was a 15,9% increase, i.e. 19 days less needed to obtain 3 litters.

In the area of reproduction, such traits as : the number of rabbits per litter and the number at weaning, has ben shown [10] to reflect the females reproduction value. The increases which occurred in tis area can be considered as high. It was 2,5% when calculated per one generation. The values for the F_5 generation are high for both lines. The higher difference of 0.7 rabbits in line N-2 was statistically

significant.

In comparison to the literature it can be ascertained that our results were comparable to those of other authors. [7] had similar results, while [2] obtained 0.2 fewer rabbits. [9] In his research on 6 generations recorded 8.9 rabbits born and 7.3 rabbits weaned. [6] gave for the F_5 generation a value of 7.3 rabbits born per litter. Decidedly low values for White New Zealand rabbits were reported by [1] 4.7 rabbits born and 5.7 weaned. [11] under Spanish conditions reported values similar to ours. [12] recorded an increase of 1.3 rabbits born and 1.2 weaned which are values comparable to ours. Similar results are given by [10]. It is difficult to compare increases in area of effective matings and the time needed to the 3rd litter. However it needs to be mentioned that a successful mating rate of 78% is high and completely satisfactory. Furthermore the time from the 1st mating until the 3rd generation was definitely shortened.

The high variance phenotype coefficients of reproduction traits indicate that further research could result in improved traits.

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Table 1

Fertility of does for 3 first litters

Generation	Line N - 1				Line N - 2			
	Litter size		Number rabbits in weaning		Litter size		Number rabbits in weaning	
	\bar{x}	v	\bar{x}	v	\bar{x}	v	\bar{x}	v
P	6,8	22,6	6,1	15,9	7,0	14,2	6,3	16,7
F ₁	7,1	22,1	6,3	18,7	7,4	20,7	6,7	18,3
F ₂	7,4	26,0	7,0	20,6	7,7	22,4	7,2	22,4
F ₃	7,6	24,3	7,2	21,3	7,7	20,5	7,3	18,6
F ₄	7,4	21,4	7,1	18,6	7,8	20,1	7,4	21,3
F ₅	7,8 ^a	18,9	7,2 ^b	16,8	8,2 ^a	16,3	7,6 ^b	20,3
$\frac{P}{F_5}$ %	114,7		118,0		117,2		120,6	

Means followed by name letters are significantly $P < 0,05$

Table 2

Results of rabbit growth fertility of does for first litters

Generation	Line N-1		Line N-2	
	Efficacy of covering / % /	Time to 3 rd litter / day /	Efficacy of covering / % /	Time to 3 rd litter / day /
P	68,2	134	67,2	137
F ₁	70,2	130	70,2	127
F ₂	69,8	131	71,2	124
F ₃	71,2	124	73,4	121
F ₄	74,3	121	75,8	121
F ₅	78,6	122	78,4	118
P F ₅ %	115,3	91,0	116,7	86,1