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IMPROVED BREED——SAIBEI RABBITS

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Abstract

Saibei rabbits were improved by a two-breed rotational crossbreeding system using French and Flemish Giant breeds since 1978. The rabbits have become a new fur and meat dual purpose breed of stable heredity, high produdivity, strong adaptability, and it is a hardy breed with improved feed efficiency. The total litter size averaged 7.1, survival rate at weaning was 81%, litter weight at weaning was 4836 g, individual body weight at 90 days-old and at maturity were 2116.5 and 5370 g, respectively. Gain: feed ratio was 1: 3.29 and the dressing percentage at 90 days-old was 52.6%. The Saibei is recognized as a good dual purpose breed.

In order to develop a new hardy rabbit breed that would have improved feed efficiency, rapid gain during the early stage of life, with large mature body size, good reproductive performance, strong resistance to diseases and adaptability, we conducted an experiment to improve the breed.

1 General description and performance of Saibei rabbits

1.1 General description

The coat in line 1 is yellowish-brown color and the end of tail is black, but other parts of body (abdomen) are slightly white. The coat in line 2 is full white and in line 3 is yellow.

The body of the Saibei rabbit is very plump and full over and around the hips, with a broad but short neck meaty neck, wide and deep chest, and strong legs, and shoulders are not arched.

The head is of medium size, with one big erect ear and the other drooping. In rare cases, both are erect or drooping. The eyes are big and bright. Furthermore, there is black color from nose to nose.

1.2 Performance

Reproductive performance. The total litter size was 7.1± 0.1, litter weight at birth 454 ± 71 g, individual weight at birth 64 ± 3.2 g, total milk production (indicated by litter weight at 3 weeks old) 1826 ± 67 g and litter weight and individual weight at weaning were 4836 ± 195 g and 829 ± 10 g, respectively.

Feed efficiency. When fed with usual mixed feed during 7~13 weeks of age, the daily gain (D.G) was 24 ± 1.9 g. But averaged 31.5 g when fed with balanced feed in pellets during the same period. Under usual feeding and management, the D. G. was 29.5 ± 0.89 during 14-26 weeks of age, and gain: feed ratio was 1: 3.29. The dressing percentage of young adult rabbits was 52.6% and 54.5% respectively.

Growth performance. The body weight (B.W.) at 3 months old averaged 2116.5 ± 51.3 g B.W. at 4 months old and at 6 months old was 2979 ± 110 and 4786. 5 ± 97. 7 g, respectively. The adult rabbit weight was 5370 ± 31 g.

Body size. In mature rabbits, the body length, chest measurement, ear length and width were 51.6 ± 0.1, 37.6 ± 0.2, 15.8 ± 0.1 and 8.7 ± 0.1 cm, respectively.

Pelt quality. The rabbit pelts are soft, with good density of fur, which dye well. They are suitable for making fur clothing and leather.

A comparison of Saibei rabbits with standaridized meat type rabbits is provided in Table 1.

Table 1 Comparison of Saibei with standardized meat-type rabbit

	Saibei	Standardized meat-type rabbit	
		Breeding R.	Commercial R.
Total Litter size	7.1	6	
Survival rate at weaning (g)	81	75	
Litter weight at weaning (g)	4836	4000	
B.W. at 90 days old (g)	2116.5	2200	2000
B.W. at 1 year old (g)	5370	>5000	
Gain: feed ratio	1 : 3.29	1 : 3.3~3.5	
Dressing percentage	5.26		48.0
90 days old			
Least days old			
Least number of breeding	32765	600~1500	
female rabbits			

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2 Breeding process

2.1 The ecological environment

Zhangjiakou region is located in the north-west part of Hebei province, at 39° 33' ~ 42° 09' N and 113° 29' ~ 116° 28' E. This region falls into two areas, one is the part of Inner Menggu plateau with 1300 ~ meters above sea level, another is mountainous above 2200 meters sea level. This region has a frigid or temperature continental and monsoon climate. The summer is very hot and winter very cold and mean temperature during the year was 1 ~ 8° C, with the extreme temperature -37°C in summer. The climate was dry with mean rainfall 200 ~ 500 mm and windy.

2.2 Selection and combination of sire and dam (1978 ~ 1980)

In order to get better breed combinations to possesses the desired traits, nine breeds were used (China White, Danish White, New Zealand, Japanese White, Californian, Chinchilla, German spot giganta, Frence Buck and Flemish Giants). Through observation and comparison, the combination of French Buck and Flemish Buck Giants was the best, so the two were used in the breeding system, whcih is shown in Figure 1.

Figure 1 The breeding program of Saibei Rabbits

A: L French Buck) as sire; FG (Flemish Giant) as dam

FG♀ × L♂

↓

F_1

(L • FG♀) × L♂

↓

F_2

(2L • FG♀) × FG♂

↓

F_3

(2L • 2FG)

↓

2L • 2FG♀ × 2L • 2FG♂

↓

Saibei rabbits

B: FG as sire, L as dam

L♀ × FG♂

↓

F_1

(L • FG♀) × FG♂

↓

F_2

(2FG • L♀) × L♂

↓

F_3

(FG • 2L)

↓

2FG • 2L♀ × 2FG • 2L♂

↓

Saibei rabbits

As shown in Figure 1, three generations within 3 years were produced, and from F_3, the closed breeding program began. During the 3 years, the number of breeding rabbits maintain was 2304, and selection rate was10%. Most rabbits were yellowish-brown in color, with few colors. Their body type was between L and FG. They had wider and deeper chest than FG and the constitution was stronger the L's. However most of them had one ear erect and another drooping (Called O.R.) barely both erect (E.R. or drooping (D.R.)

2.3 Selection for stable hereditary herds 1981 ~ 1985)

From F_3 selectively closed-breeding system began to used. And the nucleus group was set up with sound judgment and strict culling. Besides appearance traits, more attention was given to the physique and economical traits. As to the appearance, body weight, body length and chest measurement were tested as the main traits. The ear type and size were also considered. In the economical traits, characteristics including litter size born alive, litter and individual weight at birth,total milk production, body weight and survival rate at weaning were tested. The best ones were selected as breeding replacements. After 5 years' work, survival rate at 3 weeks old reached 84.3%, that at 6 weeks old 80.8%. Total litter size born reached 7.1 kits. Other reproductive traits are listed in Table 2.

Table 2 Reproductive traits of Saibei rabbits

	Number of litter	$X \pm S_X$	C. V
Total Litter size born alive	56	7.1±2.73	39.0
Litter weight at birth (g)	56	454±158	34.8
Individual weight at birth (g)	56	64±10.01	15.8
Total milk production (g)	148	1828±417	22.8
Litter Size at 6 weeks old	238	6.15±1.93	31.4
Individual weight at weaning (g)	82	829.3±115.3	13.9
Litter weight at weaning (g)	82	4836.4±888.2	18.4

3.1 Growth and development

The growth traits from 6 weeks to 6 months old are listed in Table 3.

At the beginning of the selection stage in the nucleus group, there were great differences among individuals in productivity, ear type and fur color. In 1983, the selected 138 rabbits fell into 3 ear type categories: OR (one erect, another drooping 44.93%), E.R. (both erect, 37.68%) and D.R. (both drooping 17.39%). The body size, body weight and their relationship were recorded in detail. The OR were the biggest (B.W. 5.69 kg, 0.09 and 0.25 kg g heavier than ER's and DR's, respectively) and the longest were the biggest (B.W. 5.69 kg, 0.09 and 0.25 kg heavier than ER's and DR's, respectively), with OR's chest measurement equal to DR's, 0.3 cm longer than ER's. The OR's were given more consideration as future improved rabbits.

Table 3 Growth traits from 6 weeks to 6 months old

	N	$X \pm S_X$	C · V
Body weight at 3 months old (g)	100	2116.5±259.3	12.3
Body weight at 4 months old (g)	54	2979±405	13.6
Body weight at 6 months old (g)	100	4786.5±493.2	10.3
Body weight at maturity (g)	783	5370±444	8.3
Body length (cm)	679	51.6±1.74	3.4
Chest measurement (cm)	679	37±63.31	8.8
Ear length (cm)	485	15.8±0.74	4.7
Ear width (cm)	485	8.7±0.70	8.0
Gain 6 ~ 13 weeks old	100	1172.7±232.8	19.9
Average daily gain between ~ 13 weeks old	100	24.4±4.85	19.9
Average daily gain between 14 ~ 26 weeks old	100	29.5±3.9	13.2
Feed efficiency	8	1 : 3.29	
Dressing percentage	26	52.6	

2.3.2 Selection methods

Selection was made mainly by their pedigree, and was made at different stages of their life. The constitution, appearance traits and main economical traits were the main traits for selection.

2.3.3 Selection by pedigree

To make selection by the qualitative character and the phenotypic value of the ancestors, pedigree selection was used.

2.3.4 Selection at birth

Litters were selected that were healthly and well developed, and whose mother had good maternal instinct, high milk production and litter survival.

2.3.5 Young rabbit selection

From weaning to sexual maturity (about 16 weeks old), the rabbits that gained rapidly and developed well were selected for future use. But at mating, the appearance and reproductive traits were very important factors for selection.

2.3.6 Selection of adults

It was easier to select at this period. But reproductive traits, like sexual desire of bucks and sement quality, total litter size, total milk production and survival rate, should be taken into account.

Throughout the selection period, the selection coefficient was abut 90%, and selection intensity was 1.76 every year, one third of the nucleus group were culled. After 6 generations the appearance characters and productive performance were similar among individuals. And the number of breeding female rabbits reached 147,000.

2.4 Further improvement of new breed (1986-1988)

After the establishment of nucleus groups with similar individual performance, the next step was to set up strains. For this reason, the growth rate after weaning, feed efficiency, dressing percentage, disease-resistance and fur characteristics were studied. In the population, three strains, i.e. O.R. strain, E.R. strain and D. R. strain, were set up. Meanwhile, in the O.R. strain, four genealogies were established, based on bucks (ear number: 3893, 1547, 2169 and 239). After several generations, reproductive traits were much improved. The range of total litter size was 1 ~ 16. Percentage of rabbits that delivered 7 kits was 73.65%. Litter size born alive averaged 7.1±2.23. And the difference in body weight at birth was small with mean B.W. 64±10 1 g. Growth ability was also greatly improved. Saibei rabbits growed quicker than the breed of FG, Californian and New Zealand, when feed balanced diet in pellets at 6 weeks of age. (see Table 4 for detail).

Table 4 Comparison of daily gain with other breeds during 40 days

Breed	Daily gain (g)	X - 18.5	X - 19.23	X - 26.5
Saibei	31.5	13**	12.25**	5.0*
Flemish Giant	26.5	8.0**	7.25**	
New Zealand	19.3	0.75		
Californian	18			

* Significant difference (P<0.05)

** Very significant difference (P<0.01)

Saibei rabbits have high quality pelts. The pelts could be used to make a variety of fur products. The Saibei rabbits are good fur and meat dual purpose breed, and its popularity has reached 1, 500,000 throughout the country.

References

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