

## REVIEW ON REX RABBIT BREEDING IN CHINA

Chen Baojiang\*, Gu Zilin, Sun Lina, Huang Yuting, Li Sufen, Liu Yajuan,  
Wang Lei, Zhao Chao, Jing Cui

Mountain Research Institute of Hebei Agricultural University Baoding China, 071001

\*Corresponding author: shyxq@hebau.edu.cn

### ABSTRACT

This article outlines the concepts of the Rex Rabbit variety and strain and points out the present situation of the Rex Rabbit strain in China. Six main problems of Rex Rabbit breeding in China are examined, e.g. paying more attention to weight, growth, the length of hair, the back hair, phenotypic trait and adulthood but ignoring wholesome coordination, hair quality, other aspects, other parts, hereditary basis and other growth stage; three kinds of simple selective breeding methods of Rex rabbit are proposed in this paper, e.g. synthesis, comprehensive selective index and simple selective breeding table method.

**Key word:** Rex rabbit, Problem of Rex rabbit breeding, Selective breeding method.

### INTRODUCTION

The breeding and rearing of Rex Rabbit has good development potential in China. Many farmers and enterprises are participating in the Rex Rabbit production industry.

The quality of the Rex Rabbit variety is one of the most important factors contributing to this industrial development. Therefore, more attention is being paid on the Rex Rabbit selective breeding sector. Some remarkable achievements had been made during last few years (Yang Li-ping *et al.*, 2000; Gu Zi-lin, 2006). But on the whole, there still exists some problems in the selective breeding of Rex Rabbit. The authors put forth some of their individual views in these areas.

### VARIETIES AND STRAINS

#### Varieties

Breeding of variety is the result of artificial selection and cultivation, and each variety possesses specific biological characteristics. The different varieties provide the different product type of the livestock. There are two main varieties of Chinese domestic rabbits: the meat variety and the fur variety. Each variety must possess the following characteristics:

- same origin : each breed should have the same origin. New Zealand white rabbit for example is the common ancestor of the American white rabbit and the Angolan rabbit while the common ancestor of Rex Rabbit are two individuals of the French meat rabbit;
- stable heredity;
- unique character and high product performance : the variety should have a unique characteristic feature e.g. hair, fur or meat, or high production performances and these must be passed down stably to the next generation;
- certain structure : 3-5 strains should be established in each kind of variety. Every strain has its own characteristics features and the variety can be improved through thoroughbred breeding;
- enough quantity : there are 200-300 founder female groups in every strain and 600-1500 founder females in every variety;
- be recognized by the government or certain Breeding Community.

## **Strain**

The strain is the cell of variety. A variety is composed of certain strains.

The characteristics of strain are as follows: Prominent features (such as hair density, weight, reproductive ability), relatively stable heredity; available in certain quantity (200-300, female rabbit).

## **DISCUSSION**

### **Present situation of Rex rabbit strain in China**

#### *Past- Three kinds of strains*

In China, the Rex Rabbit strains in the past referred to the American Strain, German Strain and French Strain. However, based on the classification features above, it is difficult to classify them into any type. In fact, the Rex Rabbits in China were introduced from different countries based on the needs at the time of import. From 1982 to 1983, two batches of Rex Rabbits were introduced to Hebei Province from US. Through our investigations and analysis we found that they were mainly from three rabbit breeding field of two states. In other Provinces the situation was the same.

#### *The achievement of Rex rabbit strain breeding*

After the introduction of Rex Rabbit from different countries, China also began to work on cultivating new strain (Wang Shi-cheng *et al.*, 2002; Wang Shi-cheng *et al.*, 2001; Wang Shi-cheng *et al.*, 2001, Fu feng-sheng *et al.*, 2002) and new strains of Rex Rabbit were selected. Under the expert's guidance, new Rex Rabbit strains were cultivated by Jiangsu Jingxing Rex Rabbit company and the Grassland Research Institute of Sichuan Province (Xu Han-Tao and Yan Hong-sheng, 2001; Xu Han-Tao, 2004) and were respectively recognized by the national council (Chen cheng-gong *et al.*, 1997; Fan Cheng-qiang *et al.*, 2003). Many colleges, universities and research units are now involved in rabbit breeding. Thus more and better new strains of rabbits can be expected in the near future.

#### *The present situation in product rabbit*

China's Rex Rabbit product performance has improved. But due to market fluctuations the profitability is unstable. Many investors had blindly joined into this field and suffered great losses. The main reason is that the Rex Rabbit strain is not top-class and the product performance is poor.

Many rabbit farmer often ask such questions like, "Which Rex rabbit strain is good?" "Whose domestic Rex rabbit is good?". Indeed, these are questions that need to be answered urgently to the farmers. The problem however is that it is difficult to answer. In fact, the strains in the most rabbit breeding plant are not pure. Usually they are the mixed-blood of the three old strains. Some rabbit plants attach importance that the breed and strain are comparatively pure. Others ignore this requirement resulting in low productivity. Rex Rabbit is unlike the meat rabbit, the hybridization is carried on in only one variety. Therefore if the Rex Rabbit has excellent product performance this favorable characteristic will be inherited by its descendants.

### **Problem about breeding in China**

Both rabbit enterprises and scholars acknowledge the importance of research and experimental works on rabbit breeding. However, in some areas there are misunderstandings in varying degrees.

#### *Pay more attention to weight but ignore the entirety coordination*

In the past, the main Rex Rabbit in our country was of the American strain. The weight of this strain was light. The breeders therefore paid more attention on the weight growth and the weight of selected adult rabbit reached 4.5 kg, or even more than 5 kg. Many failed to realize that the Rex Rabbit belongs to medium-sized rabbit variety and when the weight exceeds certain range, overall coordination will

sharply decline. This is especially so when it is vulnerable to diseases. Its productive life will be shortened.

*Pay more attention on growth but ignore hair quality*

In China, the value of Rex Rabbit is usually measured by its weight while the hair density and the fur quality were largely ignored. Many people just focused on the growth rate. After several generations of breeding, there is a boost in the growth rate but the hair quality declines. If this situation persists, the Rex Rabbit will merely become a meat rabbit.

*Pay more attention on the length of hair but ignore other aspects*

Presently the price of rabbit fur has risen in these years, the price of the Rex rabbit fur has risen and this is welcomed by the marketplace. So many persons will regard the length of hair as an important breeding index during breeding work. As long as the hair is long, the other traits were largely ignored. This one-sided pursuit of hair length and neglect for a comprehensive characteristics development will have drawbacks on the development of Rex Rabbit farm.

*Pay more attention on the back hair but ignore the other parts*

Hair density, length, uniformity are three measurable indicators of the hair quality. But hair from which part is the relevant point? It is thought that hair on the middle of back has strong representation. Therefore, to many people only the quality of the hair in the middle of the back is representative. But in fact when determining the quality of fur of Rex Rabbit the fur in all five parts (like the back, neck and abdomen) should be measured.

*Pay more attention on phenotypic trait but ignore the hereditary basis*

Since the breeding condition is quite distinct among each rabbit farm, there are significant differences in the phenotypic trait in individual farms. A basic principle of breeding animals is the phenotype which is genotype and environment. The purpose of selection is to find those phenotypic trait differences caused by genetic factors. For example, one female rabbit may give birth to only one while another eight. Rapid growth and development of the single offspring does not necessarily mean the traits of the single offspring are superior to that of the multiple offspring. If breed selection is only according to the phenotype of individual, it will be very likely to draw the individuals which has most outstanding phenotypic trait were selected.

*Pay more attention on adult but ignore other growth stage*

Very often when selecting rabbits for breeding, more attention is paid on the adult performance while the overall development is neglected. This is inappropriate as the performance of individual rabbit is affected differently at each stage of development.

## **Breeding method**

The Rex Rabbit breeding is a systematic project. It needs not only theoretical foundation, but also arduous labor. Under the theory guidance, some normal rabbit farm can carry out rabbit breeding activities. According to the author's experience, if the culturist masters the genetic traits of Rex Rabbits, he can apply simple methods to cultivate new strains and improve the quality of rabbits group. Three simple selection methods are suggested.

*Synthesis of the three old strains*

The authors breed a hybrid using the three kinds of strain from 1996 and identified matching pattern of the three strains. The synthesis is carried out as follows: firstly, American Rex rabbit (female) × French Rex Rabbit (male); secondly, outstanding female rabbits of hybrid generation × German Rex Rabbit. Through this method, the final offspring carries with it the advantageous traits of each of the three strains and this offspring is superior to any one kind of the three strains.

*Comprehensive selective index method*

According to the phenotype, heritability, economic importance, and correlation between phenotypic and genetic traits, we get the comprehensive selection index formula as follows:

$$I = \sum \frac{W_i h_i^2 P_i}{P_i \sum W_i h_i^2} \times 100$$

In the formula:

- W<sub>i</sub> is the economy significance of trait i;
- h<sup>2</sup><sub>i</sub> is the heritability of trait i,;
- W is the average value of trait i;
- P<sub>i</sub> is the observed value of trait i;

*Simple selective breeding table method*

The authors developed a simple selective breeding score tables method for the Rex Rabbit (Table 1).

**Table 1:** Score table of Rex Rabbit

Rank	Index	Grade	Remarks
Weight	3.75~4.0( 2.5、 3.5) kg	30	Weight: over 8 (3, 5)-month-old adult rabbit.
	3.5~3.74(2.0、 3.0) kg	25	Standard body type: Round-headed, short neck ,
Body type	3~3.4(2.0、 2.75) kg	20	wide chest , square body , stout leg, thick foot hair;
	Standard	20	hair density of back: thickness of 1 cm central back
	Qualified	15	hair X1.3 ,
	Low-graded	10	the standard length of back hair is between 1.8 and
Hair density	≥2.0 Ten thousand	30	2.2 cm
	≥1.7 Ten thousand	25	smooth: Coarse wool rate <5%; less smooth: coarse
	≥1.3 Ten thousand	20	wool rate < 6%, lest smooth: coarse wool rate > 6%;
Hair length	1.8-2.2	20	Overall appraisal:
	1.6-1.79	15	first-class: >90;
	<1.6	10	second-class:>85;
Hair smoothness	More Smooth	20	third-class: >70;
	Smooth	15	Can not be reserved: <70 .
	Not smooth	10	

## CONCLUSIONS

The Rex Rabbit industry in China has developed rapidly and smoothly. After undergoing many fluctuations, the Rex Rabbit market is becoming more matured. The whole Rex Rabbit industrial chain has basically being organized. All these provide a good foundation for the Rex Rabbit breeding industry. If we take full advantage of existing germ plasma resources and combine the traditional and modern technologies, we will be able to breed first-class Rex Rabbit strains.

## REFERENCES

- Fu feng-sheng, Liu Ji-yi, Sun cai 2002. Production Performance of Germany Rex Rabbit after selective breeding. *Contemporary Livestock*, 2002 (1), 43-44.
- Wang Shi-cheng, Wang Qing-ji, Min Ling-jiang 2001. Research of hair quality of French Rex Rabbit. *Journal of China Rabbit*, 2001 (4), 15-18.
- Wang Shi-cheng, Wang Qing-ji, Sun Guo-qiang 2002. Selective breeding of French Rex rabbit. *Journal of China Rabbit*, 2002 (2), 23-27.
- Wang Shi-cheng, Wang Qing-ji, Tang Shi-hong 2001. Research of reproduction performance and growth of French Rex rabbit. *The Raising Rabbit Magazine of China*, 2001 (3), 5-6.
- Xu Han-Tao 2004. Selective breeding and application of Rex rabbit. *Journal of China Rabbit*, 2004 (1), 3-5.
- Xu Han-Tao, Yan Hong-sheng 2001. Research report of variety breeding of white Rex rabbit. *Journal of Animal Science and Animal Veterinary*, 2001, 18 (3), 22-24.