REVIEW ABOUT RABBIT BREEDING IN CHINA

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ABSTRACT

This article reviews the main achievement of domestic rabbit breeding in China and summarizes the main experience and some insufficiencies of domestic rabbit breeding. Amongst the achievements are the introduction of quality breeds that have economic implications both in meat and fur production and the advancement in breeding technology and selections. The article discusses the role and importance of government support in promoting and regulating the rabbit industry in China.

Key word: Rabbit breeding, Economic implications, Selection technology, Government support.

INTRODUCTION

Selecting the suitable breed forms the foundation of livestock activities. With development of science, people gradually realized the importance of selection. It was estimated that between 35-50% of economic productivity depended on the livestock breed. For example in China presently, fur production per rabbit has reached 4,000 g, but was less than 500 g in the past. In the past, the weight gain per day of Chinese local domestic rabbit weight was 20 g and feed conversion ratio (FCR) was 5:1, but at present the meat rabbit growth reached 50 g per day and FCR is 2.7:1.

Continuous improvement of the variety is an important goal of scientific researchers. Rabbit breeding or selection is an important aspect of the rabbit farming.

Main achievements of rabbit breeding in China

Rabbit raising has a long history in China. Over the years, some systematical rabbit breeding studies were carried out and some achievements were obtained**.**

Varieties
Since 1950's, many kinds of rabbit varieties were introduced from overseas. For instance, the Angora rabbit, which is a kind of wool rabbit, was introduced successively from abroad (such as England, Germany, Japan, and Hungary). The German and French strains have contributed to Chinese wool rabbit breeding. Many meat rabbit varieties (Japan Big Checkered Rabbit, Chinchilla Rabbit, French Lop Rabbit, German Checkered Rabbit, Flemish, New Zealand Rabbit, Californian Rabbit, and Danish White Rabbit) were introduced too. Fur rabbit (Mainly Rex Rabbit) was introduced from US, Germany and France. These foreign strains made tremendous contributions to the development of Chinese Rex rabbit breeding. China has almost all kinds of world rabbit varieties with outstanding genes.

Along with new varieties of rabbit introduced, selective breeding was carried out resulting in some outstanding accomplishments. With government support, more than 20 new domestic rabbits varieties have been successively adapted.

In China, the fair rabbit breeding was usually carried out by the rabbit breeders and many new varieties were selected. The first strain was Chinese Angora rabbit, followed by other types that were

successfully adapted. Through perseverance, the wool rabbit breeding achieve a breakthrough and the wool yield reached the highest level in the world. The wool product of a female rabbit reached 4,729 g/years while number for the male rabbit was 2,982 g/years.

In China most meat rabbit varieties were also introduced from the overseas. Through fifty years study and research, the Taihang rabbit, Anyang brown rabbit, Haerbin white rabbit, Saibei rabbit etc. were bred and adapted. Some new varieties are bred from local rabbit variety and other new varieties were from abroad.

The history of Rex Rabbit raising is short in China. At first, Rex Rabbit raising depended primarily on variety introduced. Now some experts develop hybrid between strains. Through several years of experiment, Gu ZiLin (2002) bred the tri-hybrid which takes America Rex rabbit as female parent, France Rex rabbit as first generation male parent and Germany Rex rabbit as the second generation male parent. The new Rex Rabbit strain takes advantage of the three kinds of strains characters. Following this, other Rex Rabbit strains (such as Venus Rex rabbit, Jirong Rex rabbit) were selected. At present, the scientists and experts in universities, colleges and research institutes are continuing with experiments on fur rabbit variety and more and more outstanding varieties of fur rabbit will probably emerge in future.

Methods of selective breeding

Currently, rabbit breeding method is primarily on conventional method in China and some development is seen. A set of crossbreed pattern was successfully designed by Zhu Manxing (1995) and this laid the foundation for further research. Practical application showed that the pattern can reduce the disturbance and the influence of the exogenous factors of the rabbit selective breeding, enhances the selective breeding efficiency and promote the management level and efficiency. Gu Zilin (1999) used the composite choice index (the body weight, the wool density and the survival percentage) method to select 3 months old, 5 months old and the grown-up Rex Rabbit. After three generations, the corresponding characteristics were enhanced significantly. Long Jirong (2000) estimated heredity parameter of reproduction and the production characteristics. The results showed that the heritability of reproduction is low (0.119 to 0.193) while the reproduction characteristic has strong correlations (0.415-0.974). The growth and weight heritability index was 0.415-0.576 and 0.390-0.816 respectively. So the final growth could be seen indirectly in early body weight. Zhao Hui Ling (2005) had measured the blood AKP, GPT and GOP level of the 1 year old Rex Rabbit and found that the AKP level was remarkably positive correlation with wool yield ($P<0.05$). Wu Xinsheng also found that the AKP level had positive correlation to the weight and weight growth of meat rabbit ($P<0.01$). Yang Fengping (2001) conducted the research on the relationship between the polymorphism of partial plasma protein of meat rabbit and the production performance and found that they showed significant relationship. Fan Chengqiang (2003) analyzed the main economic feature and estimated the heredity parameter of the white Rex Rabbit. The research indicated that the white Rex Rabbit was similar to meat rabbit in the heritability of reproduction of the growth. Wang Shicheng (2001) estimated the quantitative hereditary characteristic of French Rex Rabbit and found the parameter of reproduction was 0.15 and the weight was 0.20.

The experts in China have also applied the biological technology on domestic rabbit selective breeding. For example: Pan Qingjie (2004) established the mammary gland biology reactor of Lactoferrin in domestic rabbit; Wang Minhua (1996) obtained transgenic rabbit, which using microinjection shifted the anti- pig acute communicable disease virus nuclear enzyme gene into rabbit body. Yang Liping (2000) has carried on the heredity analysis on the New Zealand white rabbit, the California rabbit and Elco rabbit; Han Chun mei (2005) selected 13 microsatellite locals to PCR to expand increases gene group DNA of 30 Rong Rabbit, then introduced electricity on 8% polyarcylamide gel electrophoresis (PAGE), examined colony's average allele, the average heterzygosity, the average PIC, as well as 13 units places accumulations of non- father removing rate and confidence. Xu Yong (2003) applied the single primer PCR fingerprint technology on carrying on the DNA fingerprint analysis for the hereditary structures of Vc- I, Vc- II Rex Rabbit, the Japan Big

Checkered Rabbit (JWR) and the Chinchilla Rabbit (QZL) and found the western-style heredity distance between various strains and the individuals.

DISCUSSION

The experience and insufficiency of our country rabbit breeding

In China through the works of rabbit breeding, the huge benefit was obtained. The reasons could be as follows:

- introduction of foreign variety introduction has made a historical contribution to improvements in Chinese domestic rabbit. In China, the new variety introduced from overseas provided the hereditary basis for the new variety selection, breeding and crossing;
- all breeding projects of meat rabbit, wool rabbit and fur rabbit in China were completed under Chinese government sponsorships. The government provides funding support and technical guidance to rabbit cultivation;
- in China, domestic rabbit production is mainly by the family unit. So, rabbit farmers also take part in the rabbit's breeding project. Some domestic rabbit varieties, (for example Taihang rabbit, Saibei rabbit, Big ear yellow rabbit, Anyang brown rabbit, Fujian yellow rabbit and so on) are even bred in farmer's rabbit warren. Without widespread participation by the masses, rabbit breeding as it is now would almost be impossible;
- development in Chinese rabbit breeding is guided by experts all the time. In the extremely difficult condition, these experts were able to achieve performances at low costs. Every variety created was through painstaking works of these experts.

Shortcomings

Although we has cultivated or selectively bred some new varieties, none of these is the mainstream breed. The product performance of these new varieties is unsatisfactory to the farmer. The breeding work is a long-term activity and difficultly to accomplished in a short time. World famous meat rabbit varieties such as New Zealand rabbit and California rabbit were selectively bred over a period of nearly hundred years, hence their performance is high and stable. Compared with these China still has a long way o go in rabbit breeding.

Although we had introduced many domestic rabbit varieties including meat rabbit, fair rabbit and fur rabbit from other countries we often faced difficulties in deciding which one is suitable to Chinese environment.

In the breeding process, the experts have put in a lot of hard work. But the appraisal or examination of variety is neglected .Without proper and efficient examination and approval system and procedures of breed decisions cannot be made wisely.

CONCLUSIONS AND SOME SUGGESTIONS

The domestic rabbit breeding is a long-term project. It is an important and continuous activity in the rabbit farming industry. Though China still has some shortcomings in domestic rabbit's breeding, it cannot be denied that there are some outstanding achievements and progress. In order to breed even more outstanding domestic rabbits variety which is necessary to provide beneficial support in the new rural reconstruction in China, the author has the following comments and suggestions:

Investments

Without investments successful breeding program cannot be carried out. Investment will eventually determine the selection breeding work. From the experiences of developed countries we must innovate our investment mechanism. The enterprise investment could be given a primarily role, national investment as auxiliary, multi-channel investment as coexistence, and introduction of a competitive system. This will enhance the domestic rabbit breeding program.

Strict quality specifications

It is necessary to insist on a high standard of appraising rabbit variety. One of the effective ways to master the key of breeding is formulating corresponding quality specifications. A performance determination system coupled with establishing performance determination station is fundamental.

Open style breeding

Breeding is a difficult work and need massive and comparatively longer-term capital investment, fund investment, manpower investment and especially conscious intellectual investment. Therefore, the effective way of breeding high standard variety is cooperation between expert and enterprises and the domestic and foreign parties.

United modern and traditional technology

At present, rabbit breeding method in China primarily is by the traditional way. With available new technology and scientific development, specially in biological, development, new scientific approaches must be applied to breeding of new varieties. However, it must also be noted that although the biological technology can accelerate the breeding speed some aspects of traditional methods cannot be substituted completely. A desirable approach would be a combination of the applications of the modern and scientific rabbit breeding technology with the traditional methodology to obtain a strong and safe new rabbit variety.

Cultivating the rabbit farmer

Currently the development of rabbit breeding technology is very rapid but the transfer of this to the farmers is often neglected. Farmers need to be educated and equipped with new technical information and knowledge. Rabbit experts can provide the training for the farmers with strong governmental support.

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