



PROCEEDINGS OF THE 11th WORLD RABBIT CONGRESS

Qingdao (China) - June 15-18, 2016

ISSN 2308-1910

Session Breeding and Genetics

Chen Y.F., Chen D.J., Sun, S.K., Sang ., Xie X.P., Ding X.H.

**CHARACTERISTICS AND PERFORMANCES
OF THE MINXINNAN BLACK RABBIT.**

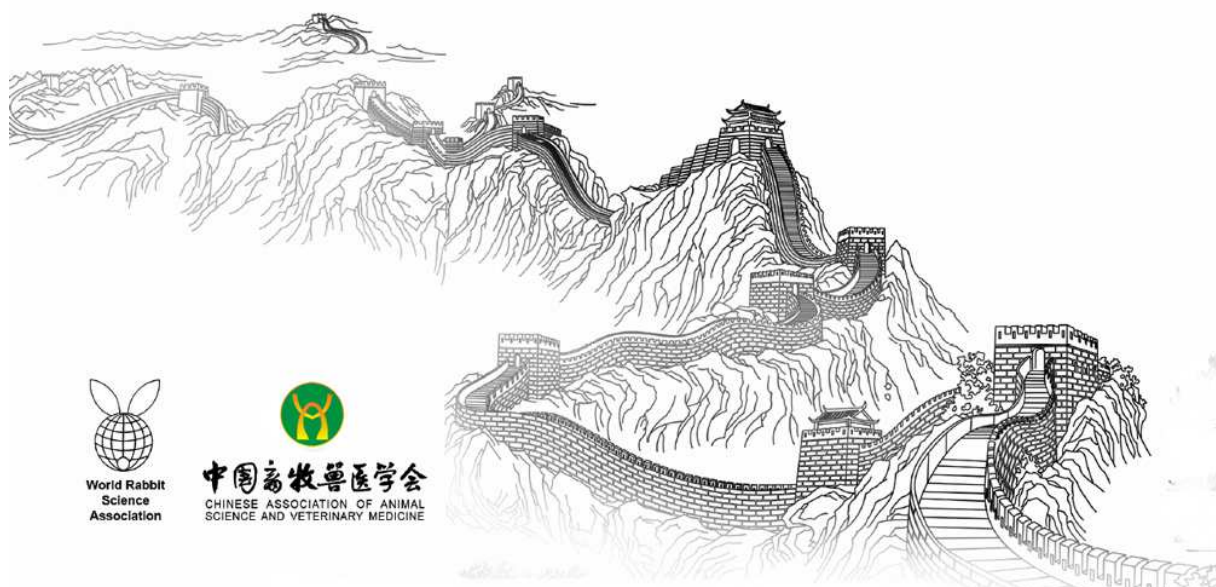
Full text of the communication

+

Poster

How to cite this paper :

Chen Y.F., Chen D.J., Sun, S.K., Sang ., Xie X.P., Ding X.H. (China) - Characteristics and performances of the minxinnan black rabbit. Proceedings 11th World Rabbit Congress - June 15-18, 2016 - Qingdao - China, 23-26 + Poster



CHARACTERISTICS AND PERFORMANCES OF THE MINXINNAN BLACK RABBIT

Chen Yan-feng¹, Chen Dong-jin¹, Sun Shi-kun¹, San Lei¹, Xie Xi-ping¹, Ding Xiao-hong²

(1. Institute of Animal Husbandry and Veterinary Medicine, Fujian Academy of Agricultural Sciences, Fuzhou, Fujian 350013, China)

(2. Longyan Tongxian Rabbit Husbandry Development Co. Ltd, Shanghang, Fujian 364213, China)

ABSTRACT

For the purpose characteristics of the Minxinnan Black Rabbit, its reproduction, growth, slaughter performance and meat quality were analyzed. The results showed that, the average litter size, litter size born alive, litter weight at 3 weeks and at 4 weeks, and survival rate of the rabbits from birth to 4 weeks of age were 7.21 kits, 6.91 kits, 1471 g, 2645 g and 91.45%, respectively. The average weights of the male and female at 10 weeks were 1389 g, 1354 g, and 1608 g, 1576 g at 13 weeks, respectively. The average weights of adult males and females were 2638 g and 2590 g, respectively. The carcass yield at the age of 90 days and 120 days were 52.55 % and 53.83 %, the carcass yields with giblet were 58.47 % and 60.42 %, respectively. The pH value, water loss rate, shear force value and drip loss of the longissimus dorsi were 6.43, 38.52 %, 11.63 Newton, and 1.22 %, respectively. The rate of cooked hind leg meat is 65.87 %. There were significant differences between male and female in the drip loss and the rate of hind leg cooked meat ($P < 0.05$).

Key words: Minxinnan Black Rabbit; characteristics; performance

INTRODUCTION

Minxinan black rabbit is a local breed of small rabbit, which has been selected by the local farmers for a long time, and mainly distributed in the regions of Longyan and Quanzhou in Fujian province. It was registered by the National Livestock and Poultry Genetic Resource Committee in 2010 in China.

Minxinan black rabbit is black fur, short-straight ear, black conjunctiva, and their bodies are symmetrical. Its adaptability, disease resistance, and meat quality are main feature. In the past decades, it was degenerated because of the shortage of selection. The status was changed by the fact that the pure rabbit herds were preserved and purified by Tongxian Rabbit Husbandry Development Co. Ltd since 2010. In the later years, the size of population of these rabbits has gradually increased year by year, together with the development of industry in the Fujian region. The purpose of this study was to get basic data for preservation and utilization of the rabbit for the future.

MATERIALS AND METHODS

Animal management All rabbits of this study were collected from the preserved pure Minxinan black rabbit herds, and raised at the rabbit farm of Longyan Tongxian Rabbit Husbandry Development Co. Ltd. Data from 68 litters born during the spring and summer were used to characterize the population.

The stocking densities of the growing rabbits were 4, 3, and 2 animals per cage at the ages of 30-60, 60-90, and 90-120 days, respectively. Cages size were 70cm×40cm×40cm. Kits were weaned at 4 weeks. The amounts of feed distributed at different stages of the growing period were: 50-80 g from 30 to 90 days of life, and 80-120 g from 90 to 150 d. The amount of feed distributed to the adult rabbits was between 140 and 160 g. Feed was distributed twice a day. Animals had unlimited access to water. The feed composition was DE11.0MJ/kg, CP17.0%, and CF13.5%.

Reproduction traits

Litter size, number born alive, litter weight at 3 weeks and at 4 weeks, body weight and size of does at the ages of the 10 weeks, 13 weeks and adult (40 weeks) were recorded.

Growth traits

The body weights and sizes of 66 animals (50% males and 50% females) randomly selected from the 68 litters were measured at 10, and 13 weeks.

Carcass traits and meat quality

12 rabbits at 90 days and 12 rabbits at 120 days (50% males and 50% females, randomly selected from the previous 66 animals) were slaughtered to measure weights of carcass, heart, liver, kidney, and leaf fat, respectively. Carcass yield with and without giblet were calculated. Fasting before slaughter lasted 12 hours. Carcasses were stored for 1 hour at environmental conditions. Eviscerated carcass weight, heart, liver, kidney, and suet were weighted.

The longissimus dorsi of 12 rabbits at 90 days were used to evaluate the pH value, water loss rate, shear force value, and drip loss. Too was evaluated the rate of cooked hind leg meat, which was that the sample weight after steaming was divided by the sample weight before steaming, and then multiplied by 100. The pH value was determined with the portable pH-Testing Instrument one hour after slaughter at kill house.

Fresh muscle Sample of 1 g was placed between 18-layer filter papers and had been pressured with Soil Expand-Compress Instrument by 35 kg for 5 minutes. The water loss was calculated by the difference between the weight before pressure and the weight after pressure divided by the weight before pressure and multiplied by 100.

Samples of 1cm width and 0.5cm thickness were used to measure the shear force value using C-LM2-Testing Instrument. The mean of three repeated measurements was calculated for each sample. Sample of 2.5 cm length was collected between the 4th and the 7th lumbar one to two hours after the rabbits slaughter in order to evaluate the drip loss. Samples were stored 24 hours in the refrigerator at 4°C, Then the water was absorbed by a paper. Samples were weighed before and after the storage.

The drip loss was calculated by the difference between the weight before storage and the weight after storage divided by the weight before storage and multiplied by 100. Hind leg meat samples were weighed and then steamed in an electric boiling drawer at 100°C during 30 minutes. After 15 minutes of air dry, samples were weighed.

Statistical Analyses

All data were analyzed using the biology statistical software SPP13.0, a T-test was performed to estimate the sex effect.

RESULTS AND DISCUSSION

Reproduction Performances

Table 1 showed the reproductive performance of the Minxinan black rabbit. These data were from 68 litters.

Table 1. Reproduction performances of the Minxinan black rabbit

Birth			3 weeks		4 weeks		Survival rate between 4 and 13 weeks (%)
Litter size	Number born alive	Litter weight(g)	Litter size	Litter weight(g)	Litter size	Litter weight(g)	
7.21	6.91	348.7	6.30	1471.0	6.54	2645.1	91.45
±1.41	±1.21	±49.8	±1.33	±310.4	±1.03	±466.4	±12.63

Growth Performances

Table 2 showed body weights and sizes of the rabbits at 10 and 13 weeks. The differences were significant between the male and female for the ear length at 13 weeks ($P < 0.05$), and for the ear width ($P < 0.01$). Coefficients of variation of body weight of the bucks at 13 weeks and the does at 10 weeks were higher than 12%. The other coefficients of variation were lower than 10%.

Table 2. Growing performances of the Minxinan black rabbit

Sex		10 weeks					3 weeks				
		Body weight (g)	Body length (cm)	Chest girth (cm)	Ear length (cm)	Ear width (cm)	Body weight (g)	Body length (cm)	Chest girth (cm)	Ear length (cm)	Ear width (cm)
♂	Mean	1388.62	33.32	21.98	9.28	5.25	1607.73	35.70	24.05	9.96	5.47
	CV/%	±111.55	±1.59	±1.20	±0.54	±0.30	±204.73	±1.43	±1.63	±0.58 ^a	±0.39 ^A
♀	Mean	1353.59	33.92	22.21	9.31	5.24	1576.00	35.08	24.03	9.65	5.22
	CV/%	±166.28	±1.51	±1.65	±0.49	±0.30	±150.94	±1.16	±1.27	±0.43 ^b	±0.26 ^B
♂+♀	Mean	1371.11	33.62	22.10	9.29	5.24	1591.40	35.38	24.04	9.80	5.34
	CV/%	±141.60	±1.57	±1.44	±0.51	±0.30	±178.43	±1.33	±1.44	±0.52	±0.35
	CV/%	10.3	4.7	6.5	5.5	5.7	11.2	3.8	6.0	5.4	6.6

Note: Values with different lowercase superscripts within the same column are significant at 0.05 level ($P < 0.05$); Values with different capital letter superscripts within the same column are significant at 0.01 level ($P < 0.01$), those with the same letters or without a letter are not significant ($P > 0.05$). The same below.

Adult Rabbits Performances

Table 3 showed body weight and sizes of the adult rabbits. The buck body length was longer than that of the does (+ 2.45cm, $P < 0.01$). All coefficients of variations of body sizes were lower than 9.0%.

Table 3. Body weight and sizes of the adult Minxinan black rabbit

Sex		Body weight (g)	Body length (cm)	Chest girth (cm)	Ear length (cm)	Ear length (cm)
♂	Mean	2637.99	41.17	28.17	10.20	5.84
	CV/%	±357.52	±2.60 ^A	±1.97 ^a	±0.55	±0.29
♀	Mean	2590.34	38.72	27.24	9.95	5.71
	CV/%	±272.45	±3.16 ^B	±1.31 ^b	±0.60	±0.32
	CV/%	10.5	8.2	4.8	6.0	5.6

Carcass Traits

The carcass traits of the rabbits at 90 days, and 120 days were showed in Table 4 and Table 5, respectively. There was no significant difference between males and females for carcass yield, with or without giblet ($P > 0.05$).

Table 4. Carcass traits of the Minxinan black rabbit at 90days.

Sex	Live weight (g)	Carcass weight (g)	Carcass yield(%)	Carcass weight with giblet(g)	Carcass yield with giblet (%)	Heart weight (g)	Liver weight (g)	Kidney weight (g)	Leaf fat weight (g)
♂	1791.7	936.7	52.2	1053.2	58.8	5.8	54.9	10.3	51.3
	±139.2 ^A	±97.9 ^a	±2.2	±97.8 ^A	±2.1	±2.8	±9.3	±0.7 ^A	±28.6
♀	1580.0	835.0	52.9	919.1	58.2	5.1	45.4	9.1	29.6±8.0
	±67.2 ^B	±78.1 ^b	±1.1	±32.7 ^B	±0.9	±1.6	±5.0	±0.3 ^B	
♂+♀	1685.8	885.8	52.6	986.2	58.5	5.5	50.1	9.7	40.5
	±151.9	±86.8	±1.7	±98.7	±1.6	±2.2	±8.7	±0.8	±23.0

Table 5. Carcass traits of the Minxinan black rabbit at 120days

Sex	Live weight (g)	Carcass weight (g)	Carcass yield (%)	Carcass weight with giblet(g)	Carcass yield with giblet (%)	Heart weight (g)	Liver weight (g)	Kidney weight (g)	Leaf fat weight (g)
♂	2028.3 ±170.3	1116.7 ±63.1 ^a	55.2 ±2.4	1256.2 ±85.7 ^a	62.0 ±2.0	6.1 ±2.2	59.3 ±10.6	10.5 ±1.9	69.8 ±21.7
♀	1811.7 ±201.5	950.0 ±112.8 ^b	52.5 ±3.4	1066.2 ±139.2 ^b	58.8 ±3.3	4.7 ±0.9	61.5 ±19.8	10.8 ±2.7	43.8 ±21.2
♂+♀	1920.0 ±210.8	1033.3 ±123.2	53.8 ±3.2	1161.2 ±148.3	60.4 ±3.1	5.4 ±1.7	60.4 ±15.2	10.7 ±2.2	56.8 ±24.6

Meat Quality

Table 6 showed meat quality characteristics of the Minxinan black rabbit at 90 days. The longissimus dorsi drip loss of the bucks was higher than that of the does (+0.27 %, $P<0.05$). The rate of cooked hind leg meat of the does was higher than that of the bucks (2.47%, $P<0.05$).

Table 6. Meat quality characteristics of the Minxinan black rabbit at 90days

Sex	pH value	Water loss rate (%)	Shear force value (N)	Drip loss (%)	Cooked meat rate (%)
♂	6.45±0.18	40.40±3.02	13.43±2.52	1.36±0.13 ^a	64.64±1.27 ^a
♀	6.40±0.21	36.63±3.24	9.82±3.69	1.09±0.15 ^b	67.11±1.45 ^b
♂+♀	6.43±0.19	38.52±3.58	11.63±3.56	1.22±0.19	65.87±1.82

Our results showed that the body weights at 10 (1337.1 g) and at 13weeks (1591.4 g) were slightly higher than that of Fujian yellow rabbit (1287.2 g, 1561.6 g, $P>0.05$), respectively (Xie X.P., et al., 2009). The adult rabbit was small, and its body weight (2614.2 g) was significantly lower than the New Zealand White rabbit(4308.1 g, $P<0.05$) (Cheng J.F., et al.,2007) , and slightly lower than Jiuyi Mountain Rabbit (2832.5 g), respectively (Wu L., et al.,2011).

There were no significant differences between carcass traits at 90 days and at 120days, thus the suitable slaughtering date should be considered according to other factors, such as the feed conversion ratio and products price.

REFERENCES

- Xie X.P., Chen Y.F., Sun S.K., 2009. Breeding of a specific male line for Fujian yellow rabbit. *Fujian Journal of Agricultural Sciences*, 24, 433-437.
- Chen L.X., Ceng J.Z., Zheng S.Z., 2013. The characteristics and feature of a specific Dehua group of Minxinan black rabbit. *The Chinese Livestock and Poultry Breeding*, 9, 66-69.
- Cheng J.F., Zhao L.Z., Lu M.W. , 2007. Breeding of the New Zealand White rabbit. *Chinese Journal of Rabbit Farming*, 2, 4-6
- Wu L., Li L.L., Zhang B., 2011. Research on the characteristics of Jiuyi Mountain Rabbit. *China Herbivores*, 31, 63-65.

=====

Characteristics and performances of the Minxinan Black Rabbit

Chen Yan-feng¹, Chen Dong-jin¹, Sun Shi-kun¹, Sang Lei¹, XIE Xi-ping¹, Ding Xiao-hong²
(1. Institute of Animal Husbandry and Veterinary Medicine, Fujian Academy of Agricultural Sciences, Fuzhou, Fujian 350013, China; 2. Longyan Tongxian Rabbit Husbandry Development Co. Ltd, Shanghang, Fujian 364213, China)



The Message

- What characteristic does the Minxinan Black Rabbit have?
- It has its own characteristics different from other varieties.
- It was registered by the National Livestock and Poultry Genetic Resource Committee in 2010 in China.

Introduction

1. Minxinan black rabbit is a local breed of small rabbits, black fur, short-straight ear, black conjunctiva, and their bodies are symmetrical. Its adaptability, disease resistance, and meat quality are main feature.
2. It was mainly located in the regions of Longyan and Quanzhou in Fujian province. In the past decades, it was degenerated because of the shortage of selection.
3. The pure rabbit herds were preserved and purified by Tongxian Rabbit Husbandry Development Co. Ltd since 2010.

Methods

1. Gestation length, litter size, and litter weight were recorded at birth, 3 weeks, and 4 weeks after birth.
2. Body weight, body length, chest girth, ear length, and ear width were measured at 10 weeks, 13 weeks, and 40 weeks of age.
3. After 12 hours of fasting, 12 rabbits at the age of 90 days and 12 rabbits at the age of 120 days were slaughtered. The carcasses were stored for one hour at environmental thermal conditions. Eviscerated carcass, heart, liver, kidney, and suet were weighted. The hind leg muscle was stored for 24 hours in the refrigerator at 4°C before chemical analysis.
4. The pH value was determined with the portable pH-Testing Instrument one hour after slaughter of the rabbits at killing house.

Results

1. Reproduction traits were showed at table 1.

Table 1 Reproduction performances of the Minxinan black rabbit

Litter size	Birth		3 weeks		4 weeks		Survival rate between 4 and 13 weeks (%)
	Number born alive	Litter weight (g)	Litter size	Litter weight (g)	Litter size	Litter weight (g)	
7.21 ±1.41	6.91 ±1.21	348.7 ±89.8	6.30 ±1.33	1471.0 ±310.4	6.94 ±1.83	2645.1 ±466.4	91.45 ±12.63

3. Carcass traits were showed at table 4 and table 5.

Table 4 Carcass traits of the Minxinan black rabbit at 90 days.

Sex	Live weight (g)	Carcass weight (g)	Carcass yield (%)	Carcass weight with giblet (g)	Carcass yield with giblet (%)	Heart weight (g)	Liver weight (g)	Kidney weight (g)	Leaf fat weight (g)
♂	1791.7 ±139.2 ^a	936.7 ±97.9 ^a	52.2 ±2.2	1833.2 ±97.9 ^a	58.8 ±2.1	5.8 ±2.8	54.9 ±9.3	10.3 ±8.7 ^a	51.3 ±28.6
♀	1580.0 ±67.2 ^a	835.0 ±78.1 ^a	52.9 ±1.1	919.1 ±32.7 ^a	58.2 ±0.9	5.1 ±1.6	45.4 ±5.0	9.1 ±8.3 ^a	29.6±8.8
♂+♀	1685.8 ±151.9	885.8 ±86.8	52.6 ±1.7	986.2 ±98.7	58.5 ±1.6	5.5 ±3.2	50.1 ±8.7	9.7 ±8.8	40.5 ±33.0

Table 5 Carcass traits of the Minxinan black rabbit at 120 days

Sex	Live weight (g)	Carcass weight (g)	Carcass yield (%)	Carcass weight with giblet (g)	Carcass yield with giblet (%)	Heart weight (g)	Liver weight (g)	Kidney weight (g)	Leaf fat weight (g)
♂	2028.3 ±178.3	1116.7 ±63.1 ^a	55.2 ±2.4	1256.3 ±83.7 ^a	62.0 ±2.0	6.1 ±2.2	59.3 ±10.6	10.5 ±1.9	69.8 ±21.7
♀	1811.7 ±90.5	950.0 ±112.8 ^a	52.5 ±3.4	1066.2 ±139.2 ^a	58.8 ±3.3	4.7 ±0.9	61.5 ±19.8	10.0 ±2.7	43.0 ±21.2
♂+♀	1920.0 ±210.8	1033.3 ±123.2	53.8 ±3.2	1161.2 ±148.3	60.4 ±3.1	5.4 ±1.7	60.4 ±15.2	10.7 ±2.2	56.0 ±24.6

2. Growing traits were showed at table 2 and table 3.

Table 2 Growing performances of the Minxinan black rabbit

	10 weeks					13 weeks				
	Body weight (g)	Body length (cm)	Chest girth (cm)	Ear length (cm)	Ear width (cm)	Body weight (g)	Body length (cm)	Chest girth (cm)	Ear length (cm)	Ear width (cm)
Mean	1388.62 ±111.55	33.32 ±1.59	21.96 ±1.20	9.28 ±0.54	5.25 ±0.30	1607.73 ±204.73	35.70 ±1.43	24.05 ±1.63	9.96 ±0.58 ^a	5.47 ±0.59 ^a
CV/%	8.03	4.78	5.48	5.80	5.80	12.73	4.01	6.79	5.78	7.14
Mean	1353.59 ±166.28	33.92 ±1.51	22.21 ±1.65	9.31 ±0.49	5.24 ±0.30	1576.00 ±190.94	35.08 ±1.16	24.03 ±1.27	9.65 ±0.43 ^a	5.22 ±0.26 ^a
CV/%	12.28	4.45	7.44	5.24	5.71	9.98	3.32	5.27	4.44	4.93
Mean	1371.11 ±141.60	33.62 ±1.57	22.10 ±1.44	9.29 ±0.51	5.24 ±0.30	1591.40 ±178.43	35.39 ±1.33	24.04 ±1.44	9.80 ±0.52	5.34 ±0.35
CV/%	10.3	4.7	6.5	5.5	5.7	11.2	3.8	6.0	5.4	6.6

Table 3 Body weight and sizes of the adult Minxinan black rabbit

Sex		Body weight (g)	Body length (cm)	Chest girth (cm)	Ear length (cm)	Ear length (cm)
♂	Mean	2637.99	41.17	28.17	10.20	5.84
	CV/%	±357.52	±2.60 ^a	±1.97 ^a	±0.55	±0.29
♀	Mean	2590.34	38.72	27.24	9.95	5.71
	CV/%	±272.45	±3.16 ^b	±1.31 ^b	±0.60	±0.32
		10.5	8.2	4.8	6.0	5.6

4. Meat qualities were showed at table 6.

Table 6 Meat quality characteristics of the Minxinan black rabbit at 90 days

Sex	pH value	Water loss rate (%)	Shear force value (N)	Drip loss (%)	Cooked meat rate (%)
♂	6.45±0.18	40.40±3.02	13.43±2.52	1.36±0.13 ^a	64.64±1.27 ^a
♀	6.40±0.21	36.63±3.24	9.82±3.69	1.09±0.15 ^b	67.11±1.45 ^b
♂+♀	6.43±0.19	38.52±3.58	11.63±3.56	1.22±0.19	65.87±1.82

Conclusions

1. The results showed that, the average litter size, litter size born alive, litter weight at 3 weeks and at 4 weeks, and survival rate of the rabbits from birth to 4 weeks of age were 7.21 kits, 6.91 kits, 1471 g, 2645 g and 91.45%, respectively.
2. The average weights of the male and female at 10 weeks and at 13 weeks were 1389 g, 1354 g, and 1608 g, 1576 g, respectively. The average weights of adult males and females were 2638 g and 2590 g, respectively.
3. The carcass yield at the age of 90 days and 120 days were 52.55 % and 53.83 %, the carcass yields with giblet were 58.47 % and 60.42 %, respectively.
4. The pH value, water loss rate, shear force value and drip loss of the longissimus dorsi were 6.43, 38.52 %, 11.63 Newton, and 1.22 %, respectively. The rate of cooked hind leg meat is 65.87 %. There were significant differences between male and female in the drip loss and the rate of hind leg cooked meat ($P < 0.05$).

