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Research article

BREEDING AND COAT-COLOUR OF RABBITS

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Abstract

For observing the breeding and coat-colour of rabbits, 10 pairs of adult male and female were used. There were seven colours as deep cinnamon agouti, light cinnamon agouti, black himalayan, self black, light cinnamon agouti with white patches, orange with white patches and albino. Out of 10 pairs there were 3 pairs of albinos where 1 pair was non recessive albinos and their all kits were white (100%); on the other hand another 2 pairs were recessive albinos. And their offspring were of various colours. Colour percentage was the highest in albino (63%) and the lowest in light cinnamon with white patches (25%). On the other hand, black himalayan (57%) and deep cinnamon agouti (43%) was the second and third highest which controls all colours as orange, self black and light cinnamon agouti. Though albino is recessive in colour, due to non recessive white and excess rearing and caring of albino the highest albino kits were found. True himalayan was not present within 10 pairs of experimental rabbit. Crosses between recessive white and another colour white patches creates in most cases in agouti and orange with white patches. Highest number of kits or bunnies (12) were found in both albino x deep cinnamon agouti and black himalayan x self black and the lowest (5) were in orange with white patches both male and female. Male and female kits were identified by observing nipple, head and external genitalia and finally secondary sexual characteristics. Sex ratio of kits or bunnies was observed 1:1 for male and female.

Keywords: Rabbit, house rabbit, hare, coat colour, breeding, mating

Introduction

Rabbits may be small beauty of nature. It's nice and attractive face is accepted by all. Moreover, its cunning motive and swiftness is really praiseworthy. Its long ear is more noticeable than other animals. Chisel like one pair incisor teeth and cut lip is the common characteristics of it. Rabbits, hares and pikas are members of the leporidae family, commonly known as lagomorphs. Rabbits are domestic and hares are wild. There are some salient differences between wild and domestic one. In nature all are of tabby in colour and for domestication Agouti, Chinchilla, Himalayan and Albino is common. Rabbits are gregarious animals. During the time of breeding male shows aggressiveness and female showed some excitation to the male for menstruation. Hutch of the rabbit is formed by stairs, so that they can enjoy their galloping. In nature it is always busy to dig hole on ground by using its fore limb and its galloping is really different from other animals. Because of having similar length of limbs of hare, its speed is higher than rabbit. It has been found that thousand of families can breed an overall doe number is much larger than any industrial breeding (Finzi, 1986). In hot climate countries the rearing system of rabbit is fit to improve for breeding (Finzi, CIHEAM). The statistics of total domestic rabbit in US in the 2000 may have been nine million (American pet, 2001). The domestic rabbits with are familiar and were derived from the European wild rabbit. Wild rabbits have less longevity (less than two years) and they reproduce quickly with litters of 5-6 kits. Domestication of rabbit by human when the Phoenicians reached Spain around 1000 BC. True domestication is thought to have begun in the 16th century after monks in captivity. After domestication, the coat colour began to vary greatly. Domesticated rabbits are kept life-long under farm conditions, depending the care by humans in housing, feeding and protection against different natural enemies. Domesticated rabbits are used for different purposes as fancy, meat, wool, hair and fur and as laboratory animals (Loliger, 1996). Currently there are approximately 50 well-recognized breeds of rabbits in the world. Breeding was conducted either in hutches or warrens and eventually rabbit rearing became popular in some cities (Grannis, 2002). The market price of white rabbits' skin is higher than colour one because the white fur can be dyed to any desired colour.

Puberty stage varies with the breed of rabbit, with smaller breeds maturing earlier than the larger breeds. Does do not have an estrous cycle and the cycle is characterized by 7-10 days of receptivity to the male. Receptivity of the female is signed by a swollen, reddened vulva, restlessness and chin rubbing. Approximately 25% of matings are referred as sterile matings which shows pseudopregnancy. The doe should be brought to the buck's cage, and if the female is receptive copulation will take place rapidly after their introduction. Females begin to build a nest at 3-4 days before its parturition, and a nest box should be in place at that time. Parturition usually occurs at night. Dystocia or difficulty birth is uncommon in the rabbit. The kits are blind at birth, deaf and hairless. The young are normally nursed only once a day, either early in the morning or late in the evening. Kits do not require colostrum because all passive immunity is received through the placenta. Myers in 1958 has shown that rabbit must burrow to breed outside the breeding season (Myers and Poole, 1961). Litter box is essential for rabbits' breeding. House rabbits are more sensitive to outside fleas, mites, parasites and pesticides infection. Pregnant rabbits pull hair from its chest for their kits nest. A well-cared for house rabbits' average life span is 7-10 years. Some rabbits' teeth

become overgrown is called malocclusion which need to trim. (Columbus House Rabbit Society). During breeding season the territories are strictly maintained (Fennessy, 1974). It seems that rabbits and other species, they reproduce successfully only within a space with odor prevails (Mykytowycz, 1973). Litter boxes can be used as defaecation and urination also. Average body weight of adult is up to 5 kg for males and 6 kg for females. Rabbits cannot vomit like rats and horses. Its stomach is thin-walled, and may be ruptured during necropsy. The female has 4-5 pairs of mammary glands. The inguinal testes generally descend at about 12 weeks of age (The laboratory rabbit, 2007). The objective of this study is to observe the coat-colour of rabbits during its rearing through selective breeding.

Materials and Methods

Breeding schedule: There are four methods of breeding- natural mating, forced mating, confined mating and artificial insemination. Natural mating method gives up to 90% conception. In natural condition its fertility is low and young are few, a new unrelated buck is good for more kits (Raising rabbits, 2005) (Table 1).

Collected varieties and numbers: Seven varieties of rabbits (Table 2) were used for this research (Plate 1). Out of 10 pairs 3 pairs were albino. On the other hand another 7 pairs were agouti deep and light colour, black Himalayan and self, orange and agouti with white patches. Only first generation of kits was observed to justify colour variation and finally its sex ratio.

Feeding and hutch: The kitchen garbage like peels of potato and brinjal, cabbage, rice and wheat husk, rice, bread, carrot, raddish and leafy vegetables were the main food of rabbit. When the female gave birth the wooden litter box with bamboo basket were served for kits shelter. Before the birth the male rabbit were separated from the female for its aggressiveness to the kits and females.

Results and Discussion

Agouti and black is dominant over the colour yellow (Castle, 1906; Hurst, 1905). Himalayan is recessive to the self colour of rabbit (Hurst, 1906). Melanic pigment sometime occurs in yellow but in much smaller amount and is chiefly localized on nose, ears, tail and feet and himalayans is related to its self colour (Plate 1 and Table 1). Agouti is the inhibitor of black and himalayan is recessive to the self colour. Again himalayan is dominant to complete albinos rabbit. Himalayan is sometimes converted into black himalayans, himalayan, agouti himalayan etc. Among the large number of animals research suggested that no himalayans have been produced. Crosses between agouti and agouti black the yellow colour could produce (Punnett, 1907). In all there have been raised from the agouti-bearing black with yellow, tortoise or orange in colour (Castle, 1906). The dilute chocolate, may be termed as orange (Plaete 1), is of a clearer richer colour than the ordinary yellow colour of rabbit (Hagedoorn, 1912). However, a comparatively few research has been conducted on the reproductive factors that control in wild which may be responsible for variation in breeding success (Dunsmore, 1971; Gibb et al 1985; von Holst et al, 2002). High temperatures might prevent the spermatogenesis and pregnancy stages (Poole, 1960; Myers, 1971; Rogers et al, 1994). With almost all breeding were observed between September and February. The lactation period begins only a

few days before parturition (Brambell, 1942). The maximum pregnancy occurred only twice (October 1980 and October 1982). Decreasing fecundity and delayed maturity in response to increased population density (Christian, 1956). Although the variation in litter size is not great in most cases, a consistent increase is evident similar to other lagomorphs (Sadleir, 1969).

Conclusion

Rabbits may be easily cultured at home providing the kitchen garbage as food. It needs not extra care. Its droppings are dry as goat so it does not pollute the environment during its rearing. The flesh of the rabbits is soft, tasty and easily digested by human. Rapid growth and huge litter size and moreover its very simple hutch and short space is enough for its culture. Its rearing can be a good productive sector of the country. Rabbits are the beauty of our residence. Genetics study on the basis of coat-colour of rabbits in houses, the variation of colour may be detected during its breeding.

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Table 1: Table showing the breeding pair and its offspring

Pair no.	Male x Female	F1	F1 colours and number	Male : Female
01	Albino x Deep Cinnamon Agouti	12	Deep Cinnamon Agouti- 4 Self Black- 4 Orange with White Patches- 4	8:4
02	Albino x Black Himalayan	9	Deep Cinnamon Agouti- 4 Black Himalayan- 2 Light Cinnamon Agouti with White Patches- 3	1:8
03	Albino x Orange	6	Deep Cinnamon Agouti- 2 Self black- 2 Orange with White Patches- 2	2:4
04	Albino x Albino	7	Albino- 7	5:2
05	Albino x Albino	6	Black Himalayan- 6	4:2
06	Albino x Albino	8	Black Himalayan- 4 Light Cinnamon Agouti- 2 Albino- 2	1:7
07	Self Black x Deep Cinnamon Agouti	6	Deep Cinnamon Agouti- 4 Self Black- 2	4:2
08	Self Black x Orange	6	Deep Cinnamon Agouti- 2 Self Black- 2 Orange with White Patches- 2	4:2
09	Black Himalayan x Self Black	12	Deep Cinnamon Agouti- 3 Self Black- 6 Orange with White Patches- 3	4:8
10	Orange with White Patches x Orange with White Patches	5	Deep Cinnamon Agouti- 1 Self Black- 1 Orange with White Patches- 3	2:3

Male 35 : Female 42 = 1:1

Table 2: Following table showing the colour percentage of the rabbits

Colour	Average (%)
Albino	63
Black Himalayan	57
Deep Cinnamon Agouti	43
Orange with White Patches	37
Self Black	34
Light Cinnamon Agouti with White Patches	33
Light Cinnamon Agouti	25

Plate 1: Upper right (light agouti with white patches); middle (black himalayan); left (albino); below right (orange with white patches)