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# Rabbits in Revenue: Scientific Farming & Management for Fur & Meat in India

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## Introduction

Rabbits, known as the Cinderella of the animal kingdom, have been mainly used for pyrogen testing and acute toxicity testing since the 1940s. However, the usage of rabbits as experimental animals compared to mice in the field of science is limited and approximately 2%. Further, Fur Animal Breeding Farm established at Garsa (Kullu Valley) in Himachal Pradesh was the first farm to import New Zealand White rabbits from U.K and Angora, White Giant, Grey Giant and Soviet Chinchilla from the former USSR in 1978-79 for production of fur and meat. Recently, cuniculture - the scientific rabbit farming mainly for meat production- is gaining popularity in India as an economical and sustainable alternative to traditional livestock farming, as they are prolific breeders with short gestation, and can be easily reared and bred in captivity. They tolerate the wide range of climatic conditions observed in India by remaining in burrows during extreme high temperatures and in hedgerows during wet and cold conditions. Currently, India has 0.592 million of rabbit population with Kerala being the number one state in rabbit production.

## Common terminologies in rabbit farming

| | |
|---|---|
| Rabbitry | scientifically designed space for keeping domestic rabbit |
| Buck | mature male rabbit kept for breeding |
| Doe | mature female rabbit kept for breeding |
| Kindling | act of parturition in rabbit |
| Kit | young rabbit with unopened eyes |
| Litter | total number of kits born in single number of kindling |
| Weaner | newly weaned rabbit (4-6 weeks) |
| Broiler Rabbit | young rabbit with very fast growth rate mainly maintained for meat production (2kg in 8-12 weeks) |
| Fryer | young rabbit (10-12 weeks) ready for market |
| Roaster | culled rabbit |
| Fur | wool of rabbit |
| Pelt | skin of rabbit |

**Physiological parameters**

| | |
|---|---|
| Birth weight | 50 – 70 grams |
| Weaning weight | 450 grams |
| Weaning age | 38 – 56 days or 4 – 6 weeks |
| Adult weight | 2 – 5 kgs |
| Puberty | 16 weeks |
| Breeding age | 20 – 36 weeks |
| Sex ratio for breeding | 1 : 10 or 1 : 15 (male : female) |
| Gestation period | 30 days |
| Litter size | 5 – 10 |
| Life span | 4 – 5 years |

**Production system in India**

1. Backyard rabbit farming: Less than 10 females with 1 or 2 males are reared on kitchen wastes and weeds to produce meat sufficient for a single small family.
2. Small-scale rabbit farming: 10 – 50 females with at least 10 males (1 buck for 3 does) are reared on leafy vegetables and concentrates to produce meat sufficient for local marketing.

**Housing system in India**

1. Deep Litter System: Small number (<30) rabbits with males and females separated are reared in an enclosure within the farm. Concrete floor covered with paddy straw, paddy husk or wood shavings of 4 – 6 inches is very commonly practiced to prevent burrowing. However, management of bunnies is difficult and adults are also more susceptible for diseases in the system of housing.
2. Cage System: Different cages according to age and physiological status such as cage of adults, cage of young, cage for kindling, nest box and hutches made of steel and wood are utilized for rearing animals separately within a farm.

Bedding material is not necessary for mesh flooring; however, straws, wood chips and sawdust are considered satisfactory bedding in a deep litter system.

**Optimal environmental conditions condition**

| | |
|---|---|
| **Light: Dark (in hrs)** | 12: 12 |
| **Ventilation Rate** | 10 – 12 air changes per hour |
| **Temperature** | 15 – 24°C |
| **Relative Humidity** | 50 – 60% |
| **Floor Spacing** | adult: 2000 – 3000 $cm^2$<br>breeding: 5000 $cm^2$<br>young ones: 1 – 1.5 $m^2$ (for 20 -30 kits) |

| | |
|---|---|
| **Cage specification** | one pair of large size breed: 120 x 90 x 45 $cm^3$<br>one pair of medium-sized breed: 90 x 60 x 45 $cm^3$<br>one pair of small-sized breed: 60 x 45 x 20 $cm^3$ |

**Feeding management**

Rabbits are omnivorous in their feeding habit and are mainly reared on green fodder. The pseudo-rumination or the behaviour of coprophagy commonly observed among them is essential for the synthesis of water-soluble vitamins (Vitamin B) within the caecum through bacterial action, and in the conversion of cellulose into meat. Lysine, histidine, isoleucine, leucine, methionine, phenylalanine, threonine, tryptophan and valine are the indispensable essential amino acids for growing rabbits. Concentrate feed rich in sulphur-containing amino acids is commonly used in commercial rabbit farming for fur production. Pellet feeding, either as all-grain pellets (containing fodder) or composite pellets (containing concentrates and fodder), is followed in commercial farming for reducing feed wastage, selective feeding and enhancing feed utilisation. Based on the body weight and physiological status, an adult rabbit weighing 2.5 – 3.5 kg consumes, on average of 125 – 150 g (50g/kg body weight) of food and 10ml/100g body weight water per day; while lactating does consume an average of 250 – 400 g of food and 3 – 5 L water per day. Figure 1 depicts the feed intake pattern in rabbits.

**(a)**

| | |
|---|---|
| Energy | maintenance: 502 KJ for 1kg body weight<br>increment: 168 KJ for 0.5kg body weight<br>breeding: maintenance + 1/4 of maintenance<br>pregnancy: maintenance + 1/3 of maintenance<br>lactation: 3 x (maintenance)<br>adult: 1.84 MJ at 5kg body weight |
| Crude protein | maintenance: 12%<br>growth: 16%<br>pregnancy: 15%<br>lactation: 17% |
| Fibre | 10 – 15% |
| Fat | 2.5 – 4% |

**(b)**

| Ingredients | Composition in concentrates |
|---|---|
| Bengal gram | 25% |
| Wheat | 20% |
| Rice bran | 20% |
| Ground nut cake | 23.5% |

| | |
|---|---|
| meat cum bone meal | 10% |
| mineral mixture | 1% |
| common salt | 0.5% |

**(c)**

| Category | Body weight (kg) | Green Fodder (g) | Concentrates (g) |
|---|---|---|---|
| Adult male | 4 – 5 | 200 | 175 |
| Adult female | 4 – 5 | 200 | 150 |
| Lactating does | 4 – 5 | 250 | 250 |
| Weaners (6 weeks) | 0.6 – 0.7 | 100 | 50 |

**Breeding management**

**(a) Sexual maturity:** Many factors such as breed, nutritional status and season of birth have been observed to affect sexual maturity. Small breeds (Dutch and Polish) attain sexual maturity at 3-4 months of age, while medium breeds attain it at 5 – 7 months, and larger breeds (Giant Flemish and Checkered Giant) attain it at 8 -12 months of **age.**

Figure 1: Feed intake

**(b) Estrus and ovulation:** Adult female rabbits are induced ovulators and are considered to be in heat when receptive and in diestrus when non-receptive to adult male rabbits (they are always in estrus unless mated or pregnant). It is also reported that does are unreceptive to bucks during 30 – 40 hours post-mating. Does in estrus is observed to have an enlarged reddish–purple vulva as a result of high estrogen and exhibits pronounced lordosis and chin rubbing. Ovulation is spontaneous, requiring stimulus either through the act of natural mating or by mechanical vaginal stimulation during artificial insemination. Lactation, moulting, and poor nutrition suppress follicular activity and result in physiological anoestrus.

**(c) Mating:** Due to the presence of strong territorial reflexes among bucks, does are brought to the bucks' cage for breeding purposes. Receptive females show typical lordosis behaviour, while it is essential to assist young does during their first mating by placing them in the cage previously occupied by breeding bucks and by raising their hind quarter during mating. Hence, hand mating is commonly followed in commercial rabbit farming with a sex ratio of 1 male for 10 females. Vigorous copulatory thrust, falling sideways and emit cry are characteristic features of rabbit mating, and the end of mating is marked by the change of the buck's stance from mounting to lying down. It is observed that keeping breeding individuals in the cage for an additional 30 minutes for the 2$^{nd}$ and 3$^{rd}$ successive mating enhances the chances of pregnancy; however, a single buck should be used only for 4 matings per day or 12 matings per week. Once the mating is confirmed, males and females are separated. Risk of

pseudo pregnancy among the females housed together is high as they tend to mount on each other; so, the selected does for breeding should be separated at least 20 days before the mating scheduled. Apart from the regular mating scheduled, most breeding farms also follow the re-mating of does on their 14 – 21 days postpartum.

**(d) Gestation management:** Abdominal palpation is the best technique for confirming conception among does and is usually done between 14 -16 days (after 12 days) of successful mating. The embryos are felt as oval-shaped marbles slipping between thumb and fingers around the midline of the abdomen when the examination hand is placed slightly in front of the hind limbs. Nesting behaviour, such as building a nest using straws and fur, is significant in the last week of gestation; however, mothering ability is less developed in does.

**Neonatal and young animals' management**

Cannibalism is predominant among does, mainly during parturition as an extension of eating the placenta, and as kits are born with very little hair cover, it is necessary to control neonatal mortality due to cannibalism and rapid heat loss. Kits are altricial, and care should be taken during the initial days as hair growth starts from the $5^{th}$ day while the eyes and ears open on the $10^{th}$ day. Young ones should be nursed in the early morning and a few times at night as the doe's milk is more concentrated for lactose than cow's milk. By the $28^{th}$ day solid diet is initiated, and at the $3^{rd}$ week, when milk fat increases up to 20 – 22%, young ones are weaned and housed in a colony-type run. Both young males and females are housed together in the early period of life and separated at 3 months of age.

**Handling**

1. Young rabbits (up to 8 weeks): rabbit should be picked by gently grasping the loin region.
2. Medium-sized rabbit: rabbit should be picked by grasping the loose fold of skin over the shoulder while supporting the rump.
3. Large-sized rabbit: rabbit should be picked by grasping the loose fold of skin over the shoulder while having an extended arm along the side of the body.

**Benefits of cuniculture**

1. Low capital requirement for housing and management with quick returns compared to livestock farming
2. Easily reared on kitchen waste and fodder, and are efficient meat producers
3. Shorter generation interval and highly prolific
4. Easy storage of meat till utilised (biological refrigerator)
5. Highly nutritious meat, low in fat, cholesterol and sodium, making it one of the recommended meats for cardiac patients
6. Employment to rural community as the rabbit production is labour intensive

**Constraints in cuniculture**

1. Lack of knowledge regarding the nutrient requirement compared to livestock
2. Lack of awareness and hands on training among the rural community
3. No registered governing body and policies for the rabbit marketing

4. High susceptibility of rabbits to respiratory and enteric diseases

**Principles of Animal Welfare**

The Five Freedoms are internationally accepted guidelines that promote the welfare of animals kept under human management. First introduced by the UK Farm Animal Welfare Council (FAWC) in 1965, these principles have since become a cornerstone of animal welfare standards across the world. As illustrated in Figure 2, the Five Freedoms offer a holistic framework for evaluating and safeguarding both the physical health and psychological well-being of animals.

**The Five Freedoms**

1. Freedom from Hunger and Thirst
2. Freedom from Discomfort
3. Freedom from Pain, Injury, and Disease
4. Freedom to Express Normal Behavior
5. Freedom from Fear and Distress

To achieve sustainable and efficient animal production, strict adherence to the principles of animal welfare is essential. The Five Freedoms provide a practical and ethical framework for ensuring both the physical and psychological well-being of animals under human care. When animals are supplied with adequate and balanced feed and fodder, sufficient space, proper housing, and a comfortable environment free from stress, their health and reproductive efficiency improve significantly. These conditions enable animals to express normal behavior, reduce the incidence of disease, and enhance overall productivity. Therefore, the integration of the Five Freedoms into all aspects of farm management is crucial for improving animal performance, farm profitability, and long-term sustainability of livestock production systems.


Figure 2: Five freedoms

**Conclusion**

Animal welfare plays a pivotal role in the sustainability of rabbit production systems. Ensuring suitable housing, balanced nutrition, effective health care, and humane handling practices contributes significantly to the physical and behavioral well-being of rabbits. Proper welfare management not only fulfills ethical responsibilities but also leads to improved growth performance, reproductive efficiency, and superior product quality. In breeding programs, maintaining good welfare conditions enhances

fertility, litter size, kit survival, and overall genetic progress by allowing animals to express their full reproductive potential. Therefore, a strong commitment to animal welfare is indispensable for the long-term success, productivity, and sustainability of rabbit production, offering mutual benefits to both the animals and producers.

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