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IN THE SEMI-ARID REGION OF INDIA.**

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STATUS OF BROILER RABBIT REARING TECHNOLOGY IN THE SEMI-ARID REGION OF INDIA.

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ABSTRACT

Interest in broiler rabbits has been generated in India during the last decade. Studies on their performance at our Institute and its surrounding area have shown that broiler rabbits can be reared successfully in almost all climatic zones of India. This paper however, deals with their performance in the semi-arid region. The breed most suitable for rearing in this region is Soviet Chinchilla (SC). Rabbits show lower body weights during summer (2.69-2.90 kg) and higher during winter–spring period (3.01-3.51 kg). The overall survivability ranged from 86.0% to 88.1%. The average body weight (g) at 0, 6, 12 and 24 weeks were 52, 749, 1568 and 2535, respectively. The average number of kindling/doe/year was 3.5 and average number of offspring /doe/year were 23.9. The litter size at birth ranged from 6.46 to 7.26, litter size at weaning from 4.92 to 6.17. Litter weight at birth ranged from 325 to 391g and litter weight at weaning from 3024 to 3488g, in different breeds. The overall conception rate was 50.3%. Milk yield (28 days) of SC does was higher (3482g) as compared to White Giant (WG) (3278g) and Black Brown (3205g).

INTRODUCTION

Rabbit has a number of attributes like high rate of reproduction, early maturity, rapid growth rate, high genetic selection potential, efficient feed and land space utilization, limited competition with man for similar foods and high quality nutritious meat (Cheeke, 1980). In addition, its skin is soft and luxurious and can be used in the production of garments and toys in cottage industries (Leach and Barret, 1984). Owen (1981) has emphasized that in developing countries where meat shortages exist, the potential of rabbit production is greatest. At least 82% of the world's production of rabbit meat occurs in the developed countries (Lebas *et al*, 1984). Lebas (1983) estimated that a family raising 5-6 does on locally available grain, forage and household waste can obtain 2 rabbits or 2.5 kg meat every week for domestic consumption or sale. Hence, small scale backyard rabbit rearing can be a useful enterprise to improve the health and socio-economic condition of the tribals, rural and urban poor in our country. Commercial rabbit production also has a great scope in and around metropolitan cities. Taking into consideration the scope and potential of rabbit rearing in our country, the Central Sheep and Wool Research Institute (CSWRI) of the Indian Council of Agricultural Research (ICAR) imported rabbit for meat in 1978 and for wool in 1979 from U.K. and former U.S.S.R. to study their adaptability and performance in different agroclimatic conditions of India. Studies at temperate, sub-temperate and semi-arid regions have demonstrated that wool type rabbits are suitable only for the hilly regions of our country while meat/fur type (broiler) rabbits can be reared successfully all over the country.

BROILER RABBIT BREEDS

Exotic breeds of broiler rabbits like Soviet Chinchilla (SC), White Giant (WG) and Grey Giant (GG) were imported from former USSR, while New Zealand White (NZW) from UK in the year 1978 by the Central Sheep and Wool Research Institute and kept at its North Temperate

Regional Station (N.T.R.S.) at Garsa in the Kullu valley of Himachal Pradesh. Later, two new color segregates viz., Black Brown (BB) and Dutch were evolved from Grey Giant and Soviet Chinchilla breeds (table 1). These segregates were selected strictly over the years for their color and type and are now breeding true to their characteristics. In 1983, a rabbit research unit was established at Avikanagar in the semi-arid region to study the performance of broiler rabbits as this region constitutes about 50% of the geographical area of the country.

Table -1: Broiler rabbit breeds and their characteristics.

Breed	Fur color	Adult weight	Country of origin	Availability at
Soviet Chinchilla	Chinchilla, steel grey	3.5 to 4.0 kg	Former USSR	CSWRI, NTRS, SRRS
Grey Giant	Greyish brown	3.5 to 4.0 kg	-do-	NTRS
White Giant	White	4.0 kg	-do-	CSWRI, NTRS, SRRS
New Zealand White	White	3.0 - 3.5 kg	U.K.	NTRS
Black Brown	Blackish Brown	3.0-3.5 kg	India	CSWRI, NTRS
Dutch	Dutch pattern	3.0 kg	India	NTRS

CSWRI - Central Sheep and Wool Research Institute, Avikanagar, Via:Jaipur Rajasthan

NTRS - North Temperate Regional Station, Garsa, Kullu, H.P.

SRRS - Southern Regional Research Station, Mannavanur, Kodaikanal, T.N.

ADAPTABILITY OF RABBITS IN THE SEMI-ARID REGION

Rabbits are highly susceptible to heat stress as they have few functional sweat glands and have a difficult heat output situation when environmental temperatures are high (Cheeke *et al*, 1987). In the semi-arid region, the rabbits show lower body weights from April to August and improvement in body weights as environment becomes favorable (Table 2). Gupta (1987) reported that the rabbits maintained a lower body weight in the semi-arid region as compared to the temperate and sub-temperature regions of the country, indicating that during the course of adaptation to the semi-arid environment there has been a reduction in their adult body weights.

Table-2: Average adult body weight (kg) of broiler rabbits in the semi-arid region.

Breed	Jan.	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
WG	3.36	3.33	3.40	3.36	3.19	3.05	3.07	3.21	3.24	3.34	3.34	3.51
GG	3.04	3.05	3.09	3.02	2.90	2.69	2.70	2.74	2.78	2.81	2.98	3.01
SC	3.20	3.25	3.22	3.25	3.07	2.79	2.84	2.80	2.90	3.12	3.17	3.27

Source : Gupta (1987)

Studies on thermoregulatory responses of SC and WG rabbits in the semi-arid environment have demonstrated that the period from October to March is favorable for rabbits while the April to

September period is stressful. As compared to WG, SC is more tolerant to hot environmental conditions because of its ability to achieve higher respiration rates i.e., higher evaporative cooling (Naqvi *et al*, 1995).

SURVIVABILITY

The survivability of rabbits varies among different age groups (table 3). The mortality in kits (0-6 weeks) was highest in all the breeds, particularly in the first week of life as the kits are naked and depend totally on the mothering ability of the doe as well as the climatic conditions prevailing at that time. During winter kits generally died of hypothermia and in summer due to hyperthermia. Similar results were reported by Damodar and Jatkar (1985). The overall survivability was high in GG and SC breeds and low in WG breed.

Table - 3. Survivability (%) in rabbits among different age groups.

Age group	WG	NZW	GG	SC
0-6 Weeks	79.82	70.83	78.15	83.17
7-12 weeks	89.32	95.85	92.24	82.89
13-24 Weeks	92.56	95.48	93.70	97.38
Adults	82.44	85.73	88.25	88.13

Source : 25 years of Research, CSWRI, 1986.

GROWTH PERFORMANCE

Growth is an important aspect of broiler rabbit production. The growth performance of different broiler rabbit breeds in the semi-arid region is presented in table 4.

Table 4. Growth performance of broiler rabbits in the semi-arid region.

Breeds	Body weights in g at weeks			
	0	6	12	24
GG	51.54	756.6	1558	2555
WG	54.05	764.4	1579	2645
NZW	53.55	756.7	1566	2521
SC	54.57	758.0	1555	2503
BB	46.08	708.1	1581	2449

Source: 35 years of Research, CSWRI, 1998.

The growth of the young during the suckling period, especially during the first three weeks,

greatly affects their later performance (Cheeke *et al*, 1987). Apart from milk yield, the litter size and doe's nursing ability also influence the pre-weaning growth. In the semi-arid region the average birth weight ranged from 46.1 in BB to 54.6 g in SC while WG and NZW had comparable birth weights. Similar results have been reported by Swai *et al* (1985). The body weights at 6 weeks of age ranged from 708g in BB to 764g in WG which compare favorably with those reported by Lahari and Mahajan (1982) for broiler rabbits in the temperate region. The 12 week weight ranged from 1554g to 1581g showing no marked breed difference. The body weight at 12 weeks is of crucial significance as the broiler rabbit is usually marketed and slaughtered at this age. The growth is fastest during 7-12 weeks period. The higher the body weight at 12 weeks, the more the carcass yield and profitability. Under experimental *ad libitum* complete diet feeding system, average weight of 2.0 to 2.3 kg at 12 weeks has been achieved at this Institute (Prasad *et al* 1996). Now efforts are being made to achieve 2.0 kg body wt. at 12 weeks by increasing the milk yield of does and improving the feed accessibility to the weaner rabbits under routine management.

REPRODUCTION

Short generation time and high reproductive potential of rabbit makes it the ideal meat producing small livestock for our country. Rabbits does have are induced ovulations and can be bred within 24 hours of parturition. Thus it is theoretically possible to produce over 11 litters per year under intensive production system (Cheeke, 1986). The average number of kindling/doe/year and average number of offspring/doe/year achieved in the semi-arid region under the semi-intensive production system are 3.5 and 23.9, respectively (Table 5), while under intensive system it was marginally higher at 4.0 litter/doe/year (Singh, 1998). Fertility is adversely affected in the semi-arid region as the semen quality of bucks deteriorates during summer and this condition continues up to the first half of the rainy season (Mathur *et al*, 1989). However, in the temperate region it was possible to achieve an average of 5.2 litters/doe/year (range 4-9) or 35-40 offspring/doe/year under the intensive production system (Gulyani and Rai, 1987). Efforts are now being made to increase doe productivity by developing a package of practices suitable for the semi-arid region.

Table - 5. Kindling performance of broiler rabbit does.

Breed	No. of kindling / doe/ year	No. of kits born	No. weaned
WG	3.3	25.9	17.3
SC	3.7	22.4	16.6
BB	3.3	22.9	15.5
Overall	3.5	23.9	16.7

Source: 35 years of Research, CSWRI, 1998.

The reproductive performance of broiler rabbits is presented in table 6. The litter size at birth (LSB) ranged from 6.46 to 7.26 while the litter size at weaning (LSW) ranged from 4.92 to 6.17 in different breeds. These results are in agreement with those reported by Damodar and Jatkar (1985). High LSB and LSW were recorded in Grey Giant (GG) and White Giant (WG) breeds. Similarly,

high litter weights at birth (LWB) and weaning (LWW) were recorded in GG and WG breeds. The average LWB and LWW ranged from 325.3 to 390.8 g and 3024 to 3488 g, respectively.

Table 6. Reproductive performance of broiler rabbits.

Breed	Litter size at		Litter weight (g) at	
	Birth	Weaning	Birth	Weaning
WG	7.26	6.17	374.2	3488
WG	7.23	5.70	390.8	3681
NZW	6.46	5.18	346.0	3301
SC	6.56	5.26	358.0	3024
BB	7.06	4.92	325.3	3304

Source : 35 years of Research, CSWRI, 1998.

Studies on reproductive efficiency of broiler rabbits by Kumar *et al* (1998) in the semi-arid region revealed that the overall conception rate was 50.25% and number of services/conception was 1.98. Highest conception rate (53.33%) was recorded in Soviet Chinchilla, followed by White Giant (48.80%) and Black Brown (46.80%).

Milk production by a rabbit doe is an important indicator of growth and health of young rabbits in their first month of life and is intimately related to the body weight achieved at the slaughter age of 12 weeks of age. Gulyani *et al* (1998) in their studies on milk production of broiler rabbit does in the semi-arid region showed that the total milk yield of SC does was higher (3482 g) as compared to WG (3279 g) and BB (3205 g) in a 28 days lactation period. There was a sudden decline in milk production in all the three breeds studied from 31 to 32 days onwards if lactation is continued beyond 28 days.

CONCLUSION

Rabbit production, though of recent origin in India, has a great scope. Due to rapidly increasing human population, food shortages may become a major problem in the future. Since all reasonable options have to be explored, rabbit can play a major role as an alternative source of meat and fur. Studies at the Central Sheep and Wool Research Institute have shown that rabbit can be reared successfully in most regions of the country in either a small scale backyard or as a large scale commercial enterprise.

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