Proceedings 4th World Rabbit Congress, 10-14 October 1988, Budapest Hungary, Vol. 1, 265-273

PERFORMANCE DATA FROM A RABBITRY IN TRINIDAD (WEST INDIES)

Rajendra K. RASTOGI
Faculty of Agriculture, The University of the West Indies, Trinidad, (W.I.)

Introduction

Most developing countries in the tropics and subtropics import major raw materials needed for manufacture of animal concentrate feeds which results in their being expensive apart from the drain on foreign exchange and a state of perpetual dependency on the foreign source of supply. The same developing countries also have an abundant supply of forages. It would then make sense to encourage exploitation of those livestock species which optimise the use of local forages and agro-by-products and minimise the use of concentrates. Many authors have discussed the potential of rabbits for meat production in the above context. /Owen et al.,1977/, /Cheeke, 1979/, /Rastogi, 1983/. /Rastogi, 1987/ suggested that small farmers and rural dwellers could usefully and profitably integrate family scale rabbit production into their routine activities combining limited amounts of concentrate with crop residues, forages, agro-by-products, kitchen scraps, etc.

Many caribbean countries are encouraging systems of small scale rabbit production utilizing mainly local forages. It is then desirable to generate information on rabbit performance under local environmental and husbandry conditions. Accordingly, the Faculty of Agriculture established a rabbitry at the University Field Station in March, 1983 with the purchase of two does and one buck from a pet keeper. The purchase of breeding stock continued for the next five to six months until most other supply sources within our reach were exhausted. The herd was closed by the end of 1983 with ten does and four bucks in stock.

This paper summarised the available performance data on growth and reproduction.

Material and Methods

The data was collected from a total of 45 does producing 210 litters during the period late 1983 to early 1986. The rabbitry was populated with locally adapted stock of mixed breeding including contributions from several breeds, viz., New Zealand White, Californian, Checkered Giant and Flemish Giant

etc. In selecting replacement stock, preference was given to whites. The does and bucks were selected from larger than average litters and, in addition, bucks were selected for postweaning growth rate. In order to keep the generation interval short, bucks were replaced by their sons as soon as possible. Notwithstanding this, significant decline in performance and high mortality of does was observed during early 1985 which was attributed principally to depression due to inbreeding. The herd was reopened and during August 1985, four bucks were brought in from Tobago - the sister island. During the period of this study, 19 bucks were used for breeding.

The rabbitry was located under an old dairy barn shed with three open sides providing for adequate ventilation. The minimum and maximum daily temperatures ranged from 22 °C to 34 °C with relative humidity mostly above 80%.

The does and bucks were housed in individual all wire cages. The automatic waterers and feeders were used. Once a week, the litter was removed and the cages were torched. There was very little odour of ammonia in the rabbitry.

Up to the middle of 1984, rabbits were fed in the morning with the pig grower pelleted ration (16% crude protein, 3.5% fat, and 6% crude fibre) and available type of wilted grass free choice. Thereafter, rabbits were gradually switched to poultry finisher pellets (18% crude protein, 2.5% fat, and 4.5% crude fibre). Based on our experience, pellets were offered in the following quantities:

	Quantity offered head/day
Dry doe & buck	80 g
Pregnant doe	
i) First 23 days	80 g
ii) Last 8 days	100 g
Lactating doe	
i) First 7 days	120 g
ii) Next 3 wks. up to weaning	120 g + (10 g/kit)
Fryer	
Started with 30 g, raising to 80 g in steps of 10 g per week	

On average, concentrate wastage and refusals amounted to about 20% of that offered.

The does were hand-mated 17 days postkindling before sunrise on Thursdays, and in case of difficulty in or failure of mating, Friday mornings. Thus,

kindling occured on Sundays or Mondays, and rarely, on Tuesdays. The rabbitry was unattended over the weekend and the last feeding was done on Friday afternoon. The kits were weaned at 28 days of age and were fattened as a group.

The management of the rabbitry can be considered to be of a reasonably high standard. There is rather low level of parasitism and no incidence of mites or sore hocks has been observed during the last two years. The rabbits have never been given any kind of systemic medication.

The data were analysed by least-squares method for unequal subclass numbers. A fixed model including only year effects was considered.

Results and Discussion

Kit performance

Least-squares constants and tests of statistical significance for kit growth traits and carcass yield are presented in Tables 1 and 2. The year of birth contributed significantly to the total variation in all measures of growth except for postweaning average daily gain during eleventh and twelfth weeks. The average kit weight at four (weaning) and 12 weeks was 318 and 1,536 grams, respectively. The postweaning average daily gain up to 12 weeks was 22 grams. Considering the type of breeding stock with its small mature body weight (≈3 kg), the humid-tropical climate and the feeding system employed, these results for growth were thought to be generally satisfactory and compared favourably with results obtained elsewhere under similar conditions /Mgheni, 1978/, /Owne, 1978/,/Omole, 1982/. However, compared to the results obtained in temperate countries using nutritionally balanced pelleted diets,/Harris et al., 1983/, /Gomez de Varela et al., 1983/ growth performance as well as concentrate pellet consumption, /Rastogi, 1986/, of rabbits in this study was slightly over half. This made it uneconomical to raise fryers to 2 kg market weight as is customary in most temperate countries. Firstly, growth rate fell rapidly after 13 weeks of age thus reducing efficiency of conversion, and secondly, there was an increase in overhead costs due to long fattening period which impacted on need for more cages.

The dressing percent in this study was based on carcass yield without feet, head, viscera, heart and lungs. It was around 51% (Table 2) and was similar to figures reported by /Bogart, 1981/. Based on experience from this study, fryers are presently slaughtered when 13 weeks old or weighing 1.6 kg live.

Doe performance

Least-squares constants and tests of significance for litter size and

weight, inter-kindling period and age at first kindling are presented in Table 3. The year of kindling caused significant variability in most traits except for kits born dead, litter size at 12 weeks and age at first kindling. These year effects were confounded with any changes in the genetic constitution of the rabbit population including inbreeding. There was a time-related decline in all measures of doe performance listed in Table 3. Thus, born total and alive declined by 1.1 and 1.2 kits per litter, respectively, between 1983-84 and 1986. During the same period, litter size at four and 12 weeks declined by 1.7 and 0.9 kits, respectively; litter weight at four and 12 weeks by 0.7 and 2.2 kg, respectively, and inter-kindling period increased by 10 days. During 1983-84, a doe on average produced 4.9 litters/year or 16.2 fryers for market compared to 4.3 litters/year or 14.2 fryers in 1985. The total number of fryers/doe/year declined further to approximately 10.5 into early 1986.

Our figures for doe performance traits as reported in the preceeding paragraph were comparable to those reviewed and reported by /Owen, 1978/ for several developing countries. However, our doe performance results were inferior to those reported by /Omole, 1982/ in Nigeria, /Lukefahr, 1985/ in Cameroon and /Shqueir, 1986/ in West Bank. Some of these differences in performance were connected with breeds, climate and feed. Other differences were particular to our herd and we look at these in a bit more detail below.

The major difference was in the level of inbreeding that might have been effective in our herd. Eleven of the nineteen bucks used in this study were descendants of the four foundation males and we estimated inbreeding to be between 5-10%. The inbreeding depression was not pronounced for kit growth but for fertility, prolificacy, and viability of kits and does. From mean values for litter size in Table 3, it was possible to compute kit mortality. The average values for perinatal, preweaning and postweaning mortality were 10.2, 22.7 and 11.8%, respectively. This meant that fully 34.5% of the kits born alive died before reaching 12 weeks of age. This level of mortality was quite high compared to that reported by /Omole, 1982/ and/Shqueir, 1986/. Further, breeding doe mortality was also very high. Of all the does leaving the herd, 44.4% died at an average of 17.2 months (Table 5). The major cause was sudden doe death syndrome. An additional 33.3% were culled due to poor performance during the first three litters. Fully 51% of the breeding does produced only four litters or less (Table 4). The result of high rate of culling and doe mortality was to affect the age composition of the herd in such a way that the average reproductive life of the doe was only about 12 months (Table 5). /Shqueir, 1986/ also

recommended that a doe should be culled after one year of production.

It should also be noted that nutritionally balanced rabbit diets are typically high in fibre and low in energy. Rabbits are unadapted to high energy poultry diet on which they were fed in this study. A high energy poultry diet is cheaper to produce than a low energy rabbit diet based on alfalfa meal. Thus, the feeding system was not designed to exploit the genetic potential of our rabbits; rather, we made use of what was available.

We should like to add further that since the introduction of males from Tobago in August, 1985, there has been a significant improvement in doe fertility, prolificacy and kit viability. The rabbitry is currently stocked with 30 breeding does and eight bucks. A group of does is randomly assigned to a buck. This will allow for group rotation breeding scheme to avoid inbreeding initially and to keep it low later.

Acknowledgement

The author gratefully acknowledges the support of Mr. B.F. LAUCKNER (Caribbean Agricultural Research and Development Institute, Trinidad) in the creation of data file and analysis.

References

BOGART R., 1981.
Reproductive ability and carcass merit of small, intermediate and large breeds of rabbits. J. Appl. Rabbit Res. 4 45-47.

CHEEKE P R., 1979.
The domestic rabbit : Potentials, Problems and Current Research, Proc. Symp. held at 71st Ann. Mtg. Am. Soc. Anim. Sci. 5.

GOMEZ de VARELA A., HARRIS D.J., CHEEKE P.R., PATTON N.M., 1983.
Evaluation of perennial peanut (Arachis glabrata) and kudzu (Pueraria phaseoloides) as feedstuffs for rabbits. J. Appl. Rabbit Res. 6 97.98.

HARRIS D.J., CHEEKE P.R., PATTON N.M., 1981.
Utilization of high alfalfa diets by rabbits. J. Appl. Rabbit Res. 4 30-34.

HARRIS D.J., CHEEKE P.R., PATTON N.M., 1983.
Feed preference and growth of rabbits fed pellets versus unpelleted diets. J. Appl. Rabbit Res. 6 15-17.

LUKEFAHR S.D., 1985.
A technical assessment of production and economic aspects of small-scale rabbit farming in Cameroon. J. Appl. Rabbit Res. 8 126-135.

MGHENI M., 1978.
Rabbit husbandry in Tanzania. In Proc. Workshop on rabbit husbandry in Africa, Provl. Rep. No. 4 of Int. Foundation Sci. 17-27.

OMOLE T.A., 1982.
The effect of level of dietary protein on growth and reproductive performance in rabbits. J. Appl. Rabbit Res. 5 83-88.

OWEN J.E., MORGAN D.J., BARLOW J., 1977.
The rabbit as a producer of meat and skins in developing countries, Rep. Trop. Prods. Inst., G108, v+ 31 pp.

OWEN J.E., 1978.
Rabbit production in tropical countries. In Proc. Workshop on rabbit husbandry in Africa, Provl. Rep. No. 4 of Int. Foundation Sci. 73-91.

RASTOGI R.K., 1983.
Rabbits for food. In Proc. Int. Seminar on New Technologies in Food Prod. for the Eighties and Beyond, Trinidad 153-157.

RASTOGI R.K., 1986.
A note on feed efficiency and cost of rabbit meat production in Trinidad, J. Appl. Rabbit Res. 9 67-68.

RASTOGI R.K., 1987.
Low input systems of rabbit production in relation to small farms in the Caribbean. J. Appli. Rabbit Res. 10 79-81.

SHQUEIR A.A., 1986.
Preliminary peformance data and economic results from a rabbitry in the West Bank. J. Appl. Rabbit Res. 9 125-128

Table 1 Least-squares constants and standard errors for kit growth traits

Classification	Average kit weight (g)				Total gain (g)		Average daily gain (g)						
	No.	4 wks.	No.	12 wks.	No.	4-12 wks.	No.	4-12 wks.	No.	5-6 wks.	7-8 wks.	9-10 wks.	11-12 wks.
General Mean	172	318±10	153	1536±20	153	1228±20	153	22±.0	138	19±.0	22±.0	24±.0	20±.6
Year of birth		**		**		**		**		**	**	*	NS
1983-84	80	51±10	61	135±31	61	82±20	61	1±.3	79	5±.6	2±.6	2±.6	..7±.6
1985-86	92	-51±10	92	-135±31	92	-82±20	92	-1±.3	59	-5±.6	-2±.6	-2±.6	-.7±.6

* *P <.05* ** *P <.01* *NS Not significant*

Table 2 Dressing percent as a function of age at slaughter

Age (wks)	No.	Mean ±S.E.
13	43	50.3 ±.8
14	28	50.7 ±.4
15	14	52.7 ±.6
16	7	51.5 ±.6

Table 3 Least-squares constants and standard errors for doe performance traits

Classification	No[a]	Kits born /litter			Litter size		No[b]	Litter weight (kg)		Inter-kindling period		Age 1st kindling	
		total	dead	alive	4 wks.	12 wks.		4 wks.	12 wks.	No.	(d)	No.	(d)
General Mean	210	4.9±.1	0.5±.1	4.4±.1	3.4±.1	3.0±.1	172	1.22±.04	5.84±.21	165	80±2	40	231±20
Kindling Year		**	NS	*	**	NS		**	**		*		NS
1983-84	97	.4±.1	-.1±.1	.5±.2	.9±.2	.3±.2	80	.41±.06	1.34±.31	75	-5±2	17	-7±4
1985	82	.3±.1	.1±.1	.2±.2	-.1±.2	.3±.2	70	-.12±.06	-.51±.30	90	5±2	23	7±4
1986	31	-.7±.2	.0±.1	-.7±.3	-.8±.3	-.6±.3	22	-.29±.08	-.83±.40				

[a] *Distribution for all litter size measures*
[b] *Distribution for litter weight at 4 and 12 weeks.*
* $P < .05$
** $P < .01$
NS *Not significant* ($P > .05$)

Table 4 Frequency distribution of kindlings completed during doe's life time

No. does	%	No. kindlings completed
7	15.5	≤ 2
10	22.2	3
6	13.3	4
8	17.8	5
5	11.1	6
4	9.0	7
5	11.1	8-11
45	100.0	

Table 5 Causes of doe disposal

Causes	No. does	Disposed %	Age (mo) Range	Age (mo) Mean
Poor performance	15	33.3	13-25	18.3
Death due to illness	20	44.4	8-25	17.2
Old age	6	13.3	26-35	30.0
Difficult breeder	4	8.9	12-26	17.3
Total	45	100.0	8-35	19.1±.9

Proceedings 4th World Rabbit Congress, 10-14 October 1988, Budapest Hungary, Vol. 1, 265-273

PERFORMANCE DATA FROM A RABBITRY IN TRINIDAD (WEST INDIES)

Rajendra K. Rastogi
Faculty of Agriculture, The University of the West Indies, Trinidad,(W.I.)

This paper summarises performance data collected from 45 does producing 210 litters over a period of three years. Local rabbits of mixed breeding were housed in modern wire cages and fed broiler finisher pellets (18% crude protein) and grass free choice. The average kit weight at four and twelve weeks was 318 and 1,536 grams, respectively. The postweaning average daily gain up to 12 weeks was 22 grams. The dressing percent was around 51%. A total of 4.9 kits/ litter were born, of which, 4.4 were alive; only 3.4 survived until weaning at four weeks and 3.0 were alive at 12 weeks. The average values for perinatal, preweaning and postweaning kit mortality were 10.2, 22.7 and 11.8%, respectively. 44.4% of the breeding does died at an average age of 17.2 months. 51% of the breeding does produced four litters or less. The average reproductive life of does was found to be about 12 months. The poor reproductive performance and high kit and doe mortality are discussed in light of feeding regime and inbreeding depression.