RABBIT PERFORMANCE IN AN EXPERIMENTAL RABBITRY IN TRINIDAD

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Abstract - This Paper summarizes performance data collected from 226 does producing 1017 litters during 1985-'93. Local, high-grade New Zealand White rabbits were housed in wire cages and fed mainly broiler finisher pellets (18% protein) and grass, free choice. The average kit weights at 3, 4 (weaning) and 12 weeks were 224g, 311g and 1.61 kg, respectively. The averages for daily gain between 3-4 and 4-12 weeks were 12 and 23g, respectively. A total of 5.4 kits per litter were born, of which 5.2 were alive; only 4.3 survived until weaning at 4 weeks and 3.9 were alive at 12 weeks. An average of 1.3 kits per litter (25% of live births) succumbed to death by 12 weeks of age. The year of kindling accounted for significant variability in all performance traits studied except in kit weight at 4 weeks and daily gain between 3-4 weeks. The season of birth effect was significant for only kit weight at 3 weeks.

INTRODUCTION

Most developing countries of the tropics and the subtropics have an abundant supply of forages but import most of their animal concentrate feeds which are becoming more expensive by the month. These same countries import significant amounts of meat and meat products. Several authors have discussed the potential of rabbits for meat production in the above context (OWEN *et al.*, 1977 ; CHEEKE, 1979 ; RASTOGI, 1983). In fact, rabbits can be considered as one of the several *emerging species* quite suitable for meat production. RASTOGI (1987) suggested that small farmers and periurban dwellers could usefully and profitably integrate small scale rabbit production into their routine farm or gardening activities, combining limited amounts of concentrate feed with crop residues, forages, agro-byproducts and kitchen scraps etc.

In the West Indies, several Caribbean Basin countries are actively encouraging small scale rabbit production, utilizing mainly local forages. It is then necessary to generate scientific information on performance of rabbits and production systems under local environmental and husbandry conditions. Accordingly, our Faculty of Agriculture established a small rabbitry at the University Field Station in March, 1983. The herd was closed by the end of 1983 with ten does and four bucks in stock. However, due to inbreeding depression in performance (RASTOGI and HEYER, 1992), outside bucks were introduced every two-to-three years. Currently, the rabbitry houses 44 breeding does, six bucks and their followers.

This Paper summarizes the available performance data on kit growth and doe prolificacy.

MATERIALS AND METHODS

The data was collected from 226 does producing 1017 litters during a nine-year period from 1985 to 1993. Earlier data was excluded from this study. Locally adapted rabbits of mixed breeding served as the foundation stock. However, the present stock is all high-grade New Zealand White.

The rabbits are housed in individual wire cages. These were initially imported from France with a grant from the French Government. New cages are built locally. Automatic waterers and feeders are in use. The does are rebred 17 days postkindling. Due to the unavailability of rabbit concentrate feed on the local market, a combination of "Broiler Finisher" pellets (18% crude protein), "Milk Booster" pellets (16% CP) and recently "Rabbit Feed" (17% CP) has been used at various times. Wilted grass from the farm is provided free choice. Further details on management, feeding and breeding of rabbits were provided in a preliminary report from this rabbitry (RASTOGI, 1991).

The replacement does were selected from proven ones based on their average litter size over the first three kindlings and the inter-kindling period. The male replacements were selected for postweaning growth. The bucks were replaced as early as possible in order to shorten the generation interval. In all, 45 bucks were used during the period of this study. A group rotation breeding scheme was in operation in order to keep the level of inbreeding down.

The data was analyzed by least-squares method for unequal subclass numbers. A fixed model including year, season and the interaction was considered.

RESULTS AND DISCUSSION

Kit performance

Least-squares constants and tests of statistical significance of various effects are presented in Table 1 for kit growth traits. The year of birth contributed significantly to the total variation in kit growth except for 4-weeks kit weight and 3-4-weeks average daily gain. The season of birth had significant effect only on average kit weight at 3 weeks. Year-by-season interaction was significant for 12-weeks kit weight and 4-12-weeks average daily gain. The models used accounted for less that 10% of the total variation in any of the measures of kit growth. Thus, the causes of significant variability in these traits could not be identified.

The average kit weights at 3,4 (weaning) and 12 weeks were 224g, 311g and 1.61 kg, respectively. The averages for daily gain between 3-4 and 4-12-weeks were 12 and 23g, respectively. Considering the small mature size (~3 kg) of the breeding stock, stressful humid-tropical climate and substandard feeding system employed, these results for growth were found to be generally satisfactory and compared favourably with results obtained elsewhere under relatively similar environment (MGHENI, 1978 ; OWEN, 1978; OMOLE, 1982; RASTOGI, 1991). However, compared with 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 of our rabbits was slightly over a half. As an aside, it should be noted that the growth rate of rabbits fell rapidly after 12-13 weeks of age thus necessitating slaughter at 1.6 kg live weight.

Table 1 : Least-Squares Constants And Standard Errors For Kit Growth Traits

Classification	No.	Average kit weight at 3 wks (g)	Average kit weight at 4 wks (g)	Average kit weight at 12 wks (kg)	Average daily gain 3-4 wks (g)	Average daily gain 4-12 wks (g)
General Mean	945	224 ± 2	311 ± 6	1.61 ± 0.01	12 ± 0.7	23 ± 0.3
Year of birth		**	NS	**	NS	**
1985	45	13 ± 9	-4 ± 26	-0.20 ± 0.07	-2 ± 3	-3 ± 1.2
1986	91	-26 ± 7	-33 ± 19	0.09 ± 0.05	-1 ± 2	-1 ± 0.9
1987	124	-29 ± 6	-38 ± 16	-0.06 ± 0.04	-1 ± 2	0 ± 0.7
1988	97	-7 ± 6	-5 ± 18	-0.02 ± 0.05	0 ± 2	0 ± 0.8
1989	97	32 ± 7	43 ± 18	0.17 ± 0.05	1 ± 2	2 ± 0.8
1990	92	11 ± 7	15 ± 18	-0.02 ± 0.05	0 ± 2	0 ± 0.9
1991	100	10 ± 6	21 ± 17	0.14 ± 0.05	1 ± 2	2 ± 0.8
1992	132	7 ± 6	5 ± 15	0.07 ± 0.04	0 ± 2	1 ± 0.7
1993	167	-11 ± 6	-4 ± 15	0.02 ± 0.04	1 ± 2	0 ± 0.7
Season of birth						
Dec. - Feb.	240	**	NS	NS	NS	NS
Mar. - May	278	-3 ± 4	-5 ± 11	0.02 ± 0.03	0 ± 1	0 ± 0.5
June - Aug.	237	14 ± 4	21 ± 11	-0.01 ± 0.03	1 ± 1	0 ± 0.5
Sep. - Nov.	190	-10 ± 4	-13 ± 11	-0.06 ± 0.03	0 ± 1	-1 ± 0.5
		-1 ± 4	-3 ± 12	0.06 ± 0.03	0 ± 1	1 ± 0.6
Year x Season		NS	NS	**	NS	**

** P< 0.01; NS, not significant (P>0.05)

Doe performance

Least-squares constants and tests of significance for litter size at various stages are presented in Table 2. The year of kindling accounted for significant variability in litter size from birth to 12 weeks. The effects of season and the interaction were not significant.

The year effects were confounded with any changes in the genetic constitution of the rabbit population as a result of selection as well as inbreeding. There was a time-related increase in the number of live kits at birth and litter size at later stages until 1992 when, presumably, inbreeding started to reverse this trend. A further perusal of Table 2 indicated that an average of 1.3 kits per litter (25% of live births) succumbed to death by 12 weeks of age. These results were superior to the preliminary ones based on data until 1986 from the same rabbitry (RASTOGI, 1991).

Doe performance figures in this study were comparable with those reviewed by OWEN (1978) for several developing countries, but were inferior to those reported by Omole (1982) in Nigeria, LUKEFAHR (1985) in CAMEROON and SHQUEIR (1986) in the West Bank *via* Israel. Some of these differences in performance were connected with breeds, climate and feed. Other differences were particular to our herd and these are examined in a little detail below.

The major difference was due to the level of inbreeding effective in our herd owing to its small size. The average level of inbreeding of *all* does kindling in 1986 was estimated at 5% and at 10% when *only inbred* does were considered (RASTOGI and HEYER, 1992). This inbreeding was the main cause of decline in the performance of does that kindled in 1986 (Table 2).

Table 2 : Least-squares constants and standard errors for litter size

Classification	No.	Litter size at birth			Litter size at		
		total	dead	alive	3 wks	4 wks	12 wks
General Mean	1017	5.4 ± 0.1	0.2 ± 0.0	5.2 ± 0.1	4.4 ± 0.1	4.3 ± 0.1	3.9 ± 0.1
Year of kindling		**	**	**	**	NS	**
1985	47	0.0 ± 0.2	0.1 ± 0.1	-0.1 ± 0.3	-0.6 ± 0.3	-0.6 ± 0.3	-0.2 ± 0.3
1986	100	-0.5 ± 0.2	0.1 ± 0.0	-0.6 ± 0.2	-0.6 ± 0.2	-0.7 ± 0.2	-0.4 ± 0.2
1987	134	0.1 ± 0.1	0.1 ± 0.0	0.0 ± 0.1	0.0 ± 0.2	0.0 ± 0.2	0.3 ± 0.2
1988	104	-0.1 ± 0.2	0.1 ± 0.0	-0.2 ± 0.2	0.0 ± 0.2	0.0 ± 0.2	0.4 ± 0.2
1989	100	0.1 ± 0.2	0.0 ± 0.0	0.1 ± 0.2	0.5 ± 0.2	0.5 ± 0.2	0.6 ± 0.2
1990	100	0.2 ± 0.2	-0.1 ± 0.0	0.3 ± 0.2	0.4 ± 0.2	0.5 ± 0.2	0.2 ± 0.2
1991	104	0.3 ± 0.2	-0.2 ± 0.0	0.5 ± 0.2	0.6 ± 0.2	0.6 ± 0.2	-0.1 ± 0.2
1992	142	0.1 ± 0.1	-0.1 ± 0.0	0.2 ± 0.1	0.1 ± 0.2	0.1 ± 0.2	-0.1 ± 0.2
1993	186	-0.3 ± 0.1	-0.1 ± 0.0	-0.2 ± 0.1	-0.5 ± 0.1	-0.5 ± 0.1	-0.7 ± 0.1
Kindling season							
Dec. - Feb.	257	NS	NS	NS	NS	NS	NS
Mar. - May	298	0.0 ± 0.1	0.0 ± 0.0	0.0 ± 0.1	0.0 ± 0.1	0.0 ± 0.1	0.1 ± 0.1
June - Aug.	259	-0.1 ± 0.1	0.0 ± 0.0	-0.1 ± 0.1	-0.1 ± 0.1	0.0 ± 0.1	0.0 ± 0.1
Sep. - Nov.	203	0.1 ± 0.1	0.0 ± 0.0	0.1 ± 0.1	0.1 ± 0.1	0.1 ± 0.1	0.0 ± 0.1
		0.0 ± 0.1	0.0 ± 0.0	0.0 ± 0.1	0.0 ± 0.1	-0.1 ± 0.1	-0.1 ± 0.1
Year x Season							
		NS	NS	NS	NS	NS	*

* P< 0.05; **P<0.01; NS, not significant (P>0.05)

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