EFFECTS OF WEANING LITTER SIZE AND SEX ON POSTWEANING BODYWEIGHT, MORTALITY AND CARCASS CHARACTERISTICS OF DOMESTIC RABBIT IN THE HUMID TROPICS

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ABSTRACT

Records of 101, mixed-breed, four weeks-old rabbit kits were used to assess the effects of weaning litter size and sex on post-weaning bodyweight, mortality and carcass characteristics under a tropical humid climate with rainy and dry season temperature and relative humidity of 30.4°C and 81.8% and 34.8°C and 61.1%, respectively. Kits for postweaning bodyweight assessment were fed according to their age (59 g to 129 g per day) on diets containing 46.59% rice bran, 25.00% palm kernel cake, 15.50% rice offal, 1.50% oyster shell, 0.55% bone meal and 0.50% salt. About 140 ml of water were supplied daily to each kit. A total of 22 rabbits (11 males and 11 females) were used to evaluate carcass characteristics. The investigated carcass characteristics were shrunk-weight (SW), bled-weight (BW), dress carcass weight (DCW), dressing percentage (%), carcass length (CL), gastrointestinal tract (%GIT), pelt (%P), external offal (%EXO), edible offal (%EDO), adipose fat (%AF), meat in cut (%MIC) and primal cuts (shoulder-rib%, rack%, loin% and leg%). Mean kit bodyweights at weaning (4 weeks) and at 16 weeks of age were 227 g and 862 g, respectively. Mean bodyweights and age of male and female rabbits used for the carcass evaluation were 1373±247 g and 1182±191 g, and 192±49 days and 166±25 days, respectively. Mortality was higher than 26% in all the litter size groups. The main cuts (as percentages of shrunkweight for female rabbit) were 12.6%, 5.2%, 10.2% and 19.1%, for the shoulder–rib, rack, loin and leg cuts, respectively. Corresponding values for the males were 14.6%, 6.0%, 10.0% and 20.5%, respectively. Post-weaning bodyweight of rabbit kits was significantly ($P<0.05$) influenced by the weaning litter size. In general term, post-weaning bodyweight decreased with increasing weaning litter size. Sex effect was not significant ($P>0.05$) for post-weaning bodyweight and carcass characteristics. The present work suggests that the consideration of sex of kits to be used as fryers may only be necessary in rabbitries experiencing very high postweaning loss. Kits weaned in lower litters may need to high quality diets to ameliorate the adverse effect of weaning litter size on post-weaning bodyweight of fryer rabbit. High mortality calls for improved nutrition, and other management practices like the use of prophylactic medicants such as vaccines, longer nursing period, gradual change from milk to mash feeds and the use of therapeutics like antibiotics and coccidiostat, in addition to the exploitation of crossbred livability.

Key words: Weaning, litter size, Carcass characteristics, Humid tropics.

INTRODUCTION

Prospect for increased livestock production in developing countries would have to involved short-cycle animals like rabbit kept by small scale farmers (Lebas, 1983). Rabbit farming is becoming more and more attractive due to its high production potentials, High mothering ability, adaptability to a wide range of conditions, high genetic variability, high roughage utilization and low cost of production (Zerrouki *et al.*, 2004, Das and Yadav, 2007). Rabbit production appears as an attractive proposition for the supply of high quality meat especially in developing countries with no cereal surplus.

According to Castellini *et al.* (2003) the post-birth body weight of rabbit kits is significantly influenced by litter size at birth due to the fact that the relative share of milk per kit decreased as the

litter size increased. Ibrahim *et al.* (2003) reported a significant increased in preweaning mortality for kits born in large litter in New Zealand White and other rabbit groups.

Major challenges to rabbit breeders in developing countries are the detailed characterization of all the existing genomes for feedlot and carcass characteristics as well as the determination of factors underlying their phenotypic expressions.

The aims of the present work are to determine the effects of weaning litter size and sex on postweaning bodyweight, mortality and carcass characteristics in domestic rabbit under tropical condition.

MATERIALS AND METHODS

A total of 101 newly weaned, mixed-breed, four weeks old rabbit kits produced in a breeding flock of 29 bucks and 65 does were used to evaluate postweaning bodyweight and mortality under a tropical humid climate with rainy and dry season temperature and relative humidity of 30.4^0c and 81.8% and 34.8°C and 61.1%, respectively. The animals used as parent stock were obtained from the Teaching and Research farm of Obafemi Awolowo University Ile-Ife (South- west, Nigeria) and a private rabbit keeper at Offa (kwara State, Nigeria). Kits for postweaning bodyweight assessment were fed according to their age (59 to 129 g per day) on diets containing 46.59% rice bran, 25.00% palm kernel cake, 15.50% rice offal, 1.50% Oyster shell, 0.55% bone meal and 0.50% salt. About 140 ml of water was supplied daily to each kit. A total of 22 rabbits (11 males and 11 females) were used to evaluate carcass characteristics. Mean bodyweights and age of adult male and female rabbits used for the carcass evaluation were 1373±247 g and 1182±191 g, and 192±49 days and 166±25 days, respectively. The carcass characteristics investigated were shrunkweight (SW), bled weight (BW), dressed carcass weight (DCW), dressing percent (D%), carcass length (CL, cm), gastrointestinal tract (GIT%), pelt (P%), external offal (EXO%), edible offal (EDO%), adipose fat (AF%), meat in loin cut (MIC%) and the proportions of the primal cuts (shoulder-rib, rack, loin and leg) as percentages of the shrunkweight (i.e. shoulder-rib%, rack%, loin% and leg%).

Slaughtering, evisceration and carcass partitioning were done using the procedures described by Awosanya (1988). Differences among means were tested using statistical k-test. A significant difference between two means was assumed where the calculated k- value was greater than 1.96 ($K_{tabulated}$ is 1.96 at α equals 0.05, otherwise the difference was assumed to be due to chance.

RESULTS AND DISCUSSION

Means weaning weights were 222 g and 232 g for male and female kits, respectively. Weekly postweaning weights were as shown in Tables 1 and 2.

Table 1: Effect of weaning litter size on postweaning bodyweight

Litter group	0	1	2	3	4	5	6
1-2	255	425	437	408	501	463	-
3-4	202	242	298	340	384	398	526
5-6	171	200	293	346	-	366	415

Table 2: Effect of weaning litter size on postweaning bodyweight

Litter group	7	8	9	10	11	12
1-2	619±41	767±223	761±241	749±105	833±172	958±232
3-4	543±83	595±93	634±75	676±101	703±74	729±99

The litter size in which kits were weaned significantly ($P<0.05$) influenced the postweaning body weight. In general terms, kits weaned in litters of 1 or 2 kits were significantly heavier ($P<0.05$) than those weaned in larger litters (Tables 1 and 2). Differences in sex was not significant ($P>0.05$) for

postweaning bodyweights although female kits were, on the average, heavier at 16 weeks of age (Tables 3 and 4).

Table 3: Effect of sex on postweaning bodyweight

Week	0	1	2	3	4	5	6
Male	222	256	330	356	455	523	475
Female	232	243	327	380	434	456	499
Mean	227	256	329	368	444	490	487

Table 4: Effect of sex on postweaning bodyweight

Week	7	8	9	10	11	12
Male	618	618	645	636	708	835
Female	580	645	662	716	800	890
Mean	597	631	653	676	756	862

Most of the postweaning mortality occurred before the 10th week of age. Kits weaned in small litters of 1 or 2 kits had significantly lower ($P<0.05$) mortality rate compared with those weaned in litters of 3 or more kits. Mortality rate was also lower in female than in male kits. The primal cuts (as percentages of shrunkweight for female rabbit were 12.6%, 5.2%, 10.2% and 19.1% for the shoulder–rib, rack, loin and leg cuts, respectively. Corresponding values for the males were 14.6%, 6.0%, 10.0% and 20.5%, respectively. Sex effect was not significant ($P >0.05$) for all the investigated carcass traits (Table 5).

Table 5: sex effect on carcass characteristics of adult male a female rabbits

	LW	SW(g)	BW(g)	DCW(g)	D%	CL(Cm)	GIT%	P%	EXO%	ED%	AF%	MIL%
♂	1245±194	1190±168	1159±168	550±100	46±4	37±1	18±4	9±1	13±1	4±0.5	0.7±04	86±4
♀	1315±140	1222±118	1195±119	590±100	47±3	33±1	18±2	9±1	13±1	5±1	0.8±05	87±3

♂ and ♀ represents male and female respectively, differences were not significant ($P>0.05$)

The present results suggest a direct effect of litter size on post weaning body weight probably as a result of the initial setback in the pre-weaning growth of kits in comparatively larger litters. Castellini *et al.* (2003) reported a litter size effect on kits bodyweight at 70 days, postpartum. The present work suggest that sex may be an important factor in selecting weaned kits to be used as fryers as female kits survived better than males. The differences in bodyweight of female and male kits in this study agreed with earlier submissions on sexual dimorphism in livestock species (Arrington and Kelley, 1978; Swai *et al.,* 1985; Mahgoub *et al.,* 2005). The variations in the reports of different workers as to which sex is heavier may be as result of differences in breeds and or strains and rearing conditions.

High mortality is common in rabbits under captivity in the tropics. Attah (1986) reported a preweaning mortality of 71% and 84% for New Zealand White and New Zealand White x Chinchilla crossbred, respectively. Ibrahim *et al.* (2003) reported a litter pre-weaning mortality rate of 74.97% for the purebred New Zealand White rabbit. Such high mortality call for improved nutrition, and other management practices like the use of prophylactic medicants such as vaccines, longer nursing period, gradual change from milk to mash feeds and the use of therapeutic medicaments like antibiotics and coccidiostat in addition to the exploitation of crossbred livability.

The proportion of bones (estimated from the loin lean to bone ratio) underscore the potentials of domestic rabbits for meat production as it is lower than the proportion of bones reported for adult Omani Jebel Akhdal goats (Mahgoub *et al.,* 2005).

CONCLUSIONS

The present work suggests that the consideration of sex of kits to be used as fryers may only be necessary in rabbitries experiencing very high postweaning loss. Kits weaned in lower litters may need be subjected to high quality diets to ameliorate the adverse effect of weaning litter size on post-weaning bodyweight of fryer rabbit. The high mortality in this study calls for improved nutrition, and other management practices like the use of prophylactic medicants (such as vaccines), longer nursing

period, gradual change from milk to mash feeds and the use of therapeutics like antibiotics and coccidiostat, in addition to the exploitation of crossbred livability.

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