GLOBAL JOURNAL OF BIO-SCIENCE AND BIOTECHNOLOGY

www.scienceandnature.org

EFFECT OF GENERATIONAL DIFFERENCES, HOUSING SYSTEMS, SEX AND THEIR INTERACTIONS ON THE CARCASS AND ORGAN

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ABSTRACT
A total of forty-eight weaner rabbits (Chinchilla and New Zealand White crossbred) were divided into four males in three replicates (12) as well as four females in three replicates (12) for cage (24) and also repeated in deep litter system (24)). This experiment was carried out for two generations and data obtained were analysed using Analysis of Variance in a 2x2x2 factorial arrangement. The study showed that rabbits in the second generation had higher but not significantly ($p>0.05$) different live weight and dressing percentage than those in the first generation. But the shrunk body weight and empty carcass weight showed higher significant ($p<0.05$) difference in the second generation while the hot carcass weight followed the same trend as the dressing percentage. Also rabbits in the cage system of housing recorded a higher but not significantly ($p>0.05$) different live weight and dressing percentage and at the same time, recorded higher significant ($p<0.05$) differences in their shrunk body weight, empty carcass weight and hot carcass weight than their counterparts in the deep litter system. The effects of sex was not significant for dressing percentage, shrunk body weight, empty carcass weight and hot carcass weight even though their values were higher in the males than in the females. However, some of the cut-up parts showed significant differences between the two sexes; the liver, neck and head were significantly higher in males than in females.

KEY WORDS: Rabbit, Generation, Sex, Carcass, Cage, Deep litter.

INTRODUCTION

The problem of inadequate supply of protein from the traditional livestock-cattle, sheep, goat and chickens has led to the intensification of efforts to improve on the productivity of these animals. Concurrent, with this approach was the search for other sources of animal protein and the rabbit has been thought of as being suitable in this regards. Thus, in recent years, there has been increased awareness of the advantages of rabbit meat production in the developing countries as a means of alleviating world food shortages. This is largely attributable to the rabbit's high rate of reproduction, early maturity, rapid growth rate, high genetic selection potential, efficient feed and land space utilization, limited competition with humans for foods, and high quality nutritious meat (Cheeke,1980). Rabbit meat is high in protein, low in cholesterol and sodium which makes it the ideal meat for people with coronary heart disease and high blood pressure related problems (Biobaku and Oguntona 1997). It is comparable to broiler chicken in chemical composition in that the meat is highly flavoured, nutritious, appetizing and also a good source of vitamins and iron contents (Biobaku, 1998). It has less sodium content than red meat but contains about the same amounts of iron and vitamins (Fielding, 1991). Hence, to improve rabbit meat production, there is the need to gather more information about the carcass or body composition which is also an important tool for studies of nutrition, physiology and genetics. Body composition or carcass traits are usually determined by comparative slaughter followed by chemical analysis or dissecting and weighing the body tissues (Fuller et al., 1994).

MATERIALS & METHODS

The research was carried out at the Rabbitary Unit of the University of Agriculture Teaching and Research Farm, Alabata road, Abeokuta, Nigeria ($7^0$10'N and $3^0$2'E). The area lies in the South West part of Nigeria and has a prevailing tropical climate with a mean annual rainfall of about 1037mm. The mean ambient temperature ranges from 28^0C in December to 36^0C in February with a yearly average of 34^0C. The Relative Humidity ranges from 60% in January to 94% in August with a yearly average of about 82% (Google Earth, 2006). The vegetation represents an inter-phase between the tropical rainforest and derived savannah. A total of forty-eight weaner rabbits (Chinchilla and New Zealand White crossbred) of eight weeks old, were divided equally into the cage and deep litter systems. Each system consisted of three replicates of four males each and three replicates of four females each. The experiment was carried out for two generations (years). All the routine and occasional management practices were carried out as and when due throughout each generations.

Data Collection and Statistical Analysis

The does were mated at maturity with a mating ratio of 1:4. The does were hand mated in the morning and in the evening; the bucks were allowed to ride 3- 4 times before they were withdrawn. Pregnancy test was carried out on the does by palpating at the 14^{th} and 20^{th} day. A clean and

well-disinfected kindling box was provided for the does to make nest of fur in preparation for birth. The rabbits were identified by their coat colors and weighed one week after birth using hand gloves to handle the kits. After weaning at 8 weeks, the young rabbits were fed daily and supplied with water *ad libitum.* Subsequent weights were taken weekly. Forty-eight weaner rabbits from the litters obtained in the first generation were used to carry out the experiment in the second generation. Two animals (one per each sex) from each replicate were slaughtered at the end of each generation. Animals due for slaughter were fasted for twenty-four hours by withdrawing feed only before slaughtering so as to empty the gastro-intestinal tract (GIT). The shrunk body weight (SBW) was taken before evisceration. The gastro-intestinal tract (GIT) and the organs (kidney, lungs, liver, heart and trachea) were removed and weighed after evisceration. The empty body weight (EBW) and hot carcass weight (HCW) were also recorded. All weights were measured using a sensitive electronic scale and expressed as a percentage of shrunk live weight.

EBW=SBW-GIT, HCW=EBW-Trotters and head

RESULTS & DISCUSSION

The effect of generation on carcass quality traits of the experimental rabbits is presented in Table 1. Rabbits in the second generation had higher but not significantly ($p>0.05$) different live weight and dressing percentage than those in the first generation. But the shrunk body weight and empty carcass weight showed higher significant ($p<0.05$) difference in the second generation while the hot carcass weight followed the same trend as the dressing percentage. The mean values of the loins, legs, rack, head and tail were not significantly ($p>0.05$) affected by the generation. The mean value for neck was significantly ($p<0.05$) higher in the second generation while the shoulder recorded significantly ($p<0.05$) higher mean values in the first generation. The relative weights of the gastrointestinal tract and lungs were the same in both generations. While higher but not significant ($p>0.05$) mean weights were obtained in the second generation for liver and kidney, a higher but not significant ($p>0.05$) value was recorded for spleen in the first generation. However, the relative weight of the heart showed a significantly ($p<0.0$) higher value in the second generation.

TABLE 1: Effect of generation on carcass and organ parameters

	Generation		
Parameters	1	2	SEM
Live weight (g)	1635.00	1715.00	41.01
Dressing percent (%)	77.13	79.04	2.40
SBW (g)	1583.75^{b}	1737.96^{a}	34.02
ECW (g)	1268.91^{b}	1455.36^{a}	41.06
HCW (g)	764.05	769.78	29.89
Cut-up parts (expressed as % dressed weight)			
Neck	41.17^{b}	46.83^{a}	1.84
Loins	184.63	184.63	10.54
Legs	351.71	354.63	14.88
Rack	209.96	195.71	10.57
Head	136.63	126.38	4.89
Shoulder	192.96^{a}	170.96^{b}	6.88
Tail	8.79	8.79	0.54
Organ weight (expressed as % dressed weight)			
GIT	314.82	314.82	6.89
Lungs	13.25	13.25	0.82
Liver	53.04	58.54	2.67
Heart	4.13^{b}	5.71^{a}	0.34
Spleen	0.66	0.59	0.03
Kidney	12.50	16.83	1.68

a, b, c: Means in the same column with different superscripts are significantly different at ($p<0.05$

The housing system effect on the carcass quality traits of rabbits in the first generation is presented in Table 2. Rabbits in the cage system of housing recorded a higher but not significantly ($p>0.05$) different live weight and dressing percentage and at the same time, recorded higher significant ($p<0.05$) differences in their shrunk body weight, empty carcass weight and hot carcass weight than their counterparts in the deep litter system. Also, in all the retail cut-up parts, the caged rabbits recorded higher significant ($p<0.05$) values for legs and head than the deep litter rabbits which recorded higher but not significant values for neck and tail. Higher but not significantly ($p>0.05$) different relative weights were recorded for the gastro intestinal tract and kidney of rabbits reared on the deep litter while rabbits in the cage recorded higher but not significantly ($p>0.05$) different values for liver, heart and spleen. Also, the housing system effect on the carcass quality traits of rabbits in the second generation is shown in Table 3. No significant effect was observed in the live weight, dressing percentage, shrunk body weight, empty carcass weight of the experimental rabbits except in the hot carcass weight where the values were highly significant ($p<0.05$) in the caged rabbits. The caged rabbits also recorded higher significant values for legs, rack and shoulder while the values recorded for neck and tail in the deep litter system were higher but not significant. The

values of the gastrointestinal tract and lungs followed the same trend as in the first generation while the values of the liver, heart and spleen were higher in the caged rabbits.

TABLE 2: Effect of housing system on carcass and organ parameters in first generation

	System		
Parameters	Cage	Deep Litter	SEM
Live weight (g)	1762.50	1507.50	53.02
Dressing percent (%)	79.61	74.64	3.09
SBW (g)	1712.50[a]	1455.00[b]	49.91
ECW (g)	1403.18[a]	1134.65[b]	45.03
HCW (g)	851.19[a]	676.90[b]	30.89
Cut-up parts (expressed as % dressed weight)			
Neck	40.33	42.00	2.31
Loins	201.75	167.50	13.75
Legs	406.00[a]	297.42[b]	14.13
Rack	221.33	198.58	12.85
Head	146.25[a]	127.00[b]	4.92
Shoulder	194.75	191.17	7.47
Tail	8.75	8.83	0.76
Organ weight (expressed as % dressed weight)			
GIT	309.29	320.35	8.76
Lungs	14.75	11.75	1.09
Liver	54.08	52.00	3.86
Heart	4.25	4.00	047
Spleen	0.68	0.65	0.06
Kidney	11.42	13.58	1.02

a, b, : Means on the same row with different superscripts are significantly different at ($p<0.05$)

TABLE 3: Effect of housing system on carcass and organ parameters in second generation

	System		
Parameters	Cage	Deep Litter	SEM
Live weight (g)	1783.42	1696.00	46.53
Dressing percent (%)	81.12	76.96	3.05
SBW (g)	1779.92	1647.50	28.56
ECW (g)	1481.87	1428.85	47.30
HCW (g)	840.80[a]	698.76[b]	35.48
Cut-up parts (expressed as % dressed weight)			
Neck	45.58	48.08	2.74
Loins	201.75	167.50	13.75
Legs	386.67[a]	322.58[b]	18.82
Rack	219.58[a]	171.83[b]	14.31
Head	127.75	127.00	7.44
Shoulder	187.17[a]	154.75[b]	10.18
Tail	8.75	8.83	0.76
Organ weight (expressed as % dressed weight)			
GIT	309.29	320.35	8.76
Lungs	14.75	11.75	1.09
Liver	60.92	56.17	3.69
Heart	6.17	5.25	0.49
Spleen	0.63	0.54	0.04
Kidney	12.17	21.50	2.83

a, b: Means on the same row with different superscripts are significantly different at ($p<0.05$)

At slaughter, the caged animals had better production (shrunk body weight, empty carcass weight and hot carcass weight) results than those housed on the deep litter as most of the carcass traits investigated in this study were significantly higher in the cage than the deep litter system of housing. Previous studies reported similar results of better carcass and meat quality in rabbits reared in cages than those on the floor in a pen house (Troccino *et al.*, 2004; Van Der Horst *et al.*, 1999; and Dal Bosco *et al.*, 2002) while Maertens and Van Oeckel (2001) did not find any significant difference between the two. The different body weights of caged and deep litter housed rabbits may have played a role in the different dressing percentage, as heavier rabbits have a higher dressing percentage (Szendro 1989; Roiron *et al.*, 1992 and Milisits *et al.*, 2000). Dressing percentage is influenced by stocking density while higher stocking density and smaller living space are disadvantageous (Ferrante *et al.*, 1997; Xiccato *et al.*,

1999). In this study, the deep litter -housed rabbits had the same stocking density as the cage- rabbits as well as larger living space, suggesting that their poorer dressing percentage is not related to the stocking density. Also due to restriction of movement in the cage and thus the dissipation of energy, caged animals deposit a lot of energy in form of fat. This is the reason such animal appears heavier than the ones on deep litter system where movement is freer. Table 4 shows the effect of sex on the carcass and organ weights of rabbits in the first generation.

TABLE 4: Effect of sex on carcass and organ parameters in first generation

	Sex		
Parameters	Male	Female	SEM
Live weight (g)	1670.00	1600	66.07
Dressing percent (%)	77.59	76.66	3.40
SBW (g)	1617.50	1550.00	64.71
ECW (g)	1304.32	1233.51	66.90
HCW (g)	771.33	756.76	42.77
Cut-up parts (expressed as % dressed weight)			
Neck	44.50[a]	37.83[b]	2.23
Loins	189.00	180.25	14.93
Legs	353.42	350.00	21.87
Rack	225.50	194.42	13.01
Head	146.50[a]	126.75[b]	5.93
Shoulder	199.17	186.75	7.45
Tail	9.50	8.08	0.74
Organ weight (expressed as % dressed weight)			
GIT	313.15	316.49	9.38
Lungs	13.25	13.25	1.16
Liver	60.00[a]	46.08[b]	3.26
Heart	4.67	3.58	0.46
Spleen	0.63	0.70	0.06
Kidney	13.42	11.58	1.04

a, b: Means on the same row with different superscripts are significantly different at ($p<0.05$)

TABLE 5: Effect of sex on carcass and organ parameters in second generation

	Sex		
Parameters	Male	Female	SEM
Live weight (g)	1794.30	1781.67	32.19
Dressing percent (%)	80.20	77.88	3.44
SBW (g)	1744.25	1731.67	32.29
ECW (g)	1492.43	1418.28	49.69
HCW (g)	770.68	768.88	43.34.
Cut-up parts (expressed as % dressed weight)			
Neck	51.17[a]	42.50[b]	2.42
Loins	189.00	180.25	14.93
Legs	373.17	363.08	20.40
Rack	209.83	181.58	15.69
Head	135.00	117.75	6.91
Shoulder	184.00	157.92	11.54
Tail	9.50	8.08	0.74
Organ weight (expressed as % dressed weight)			
GIT	313.15	316.49	9.38
Lungs	13.25	13.25	1.16
Liver	62.67	54.42	3.33
Heart	5.58	5.83	0.51
Spleen	0.58	0.60	0.04
Kidney	13.92	19.75	2.99

a, b: Means on the same row with different superscripts are significantly different at ($p<0.05$)

The live weight, dressing percentage, shrunk body weight, empty carcass weight and hot carcass weight showed no significant ($p>0.05$) differences but higher values were recorded for the males than females. The males, also, recorded higher values than the females in the relative weight of the retail cut-up parts with significant ($p<0.05$) differences observed in the neck and head. The relative weight of the organs of the experimental rabbits recorded higher but not significantly ($p>0.05$) different values in the females for gastro intestinal tract and spleen and also a higher but not significantly ($p>0.05$) different values in the males for heart, bile and kidney. However, a significant

($p<0.05$) difference was recorded in the males for liver. The same value of 13.25g was recorded for lungs in both sexes; however, a higher significant ($p<0.05$) difference was recorded in the males for liver. Table 5 presents the effect of sex on the carcass and organ weights of rabbits in the second generation. The live weight, dressing percentage, shrunk body weight, empty carcass weight and hot carcass weight followed the same trend as observed in the first generation. The relative weights also recorded higher values in the male rabbits than the females with the mean value of neck being significant in the males. The loins, tail, lungs, gastrointestinal tract and bile also followed the pattern observed in the first generation while higher but not significant values were recorded for heart, spleen and kidney. The effects of sex was not significant for dressing percentage, shrunk body weight, empty carcass weight and hot carcass weight even though their values were higher in the males than in the females. However, some of the cut-up parts showed significant differences between the two sexes; the liver, neck and head were significantly higher in males than in females. Similar results were reported by Ristic *et al.* (1988), who found that male animals were heavier than females in slaughter yield. Higher carcass yield in males than females, as observed in the present investigation, was also reported by Sen and Bhagwan (1999) with significant influence of sex on dressing percentage in. But the finding in this study contradicts the earlier findings of Yalcin *et al.* (2006) and Abdel-Azeem *et al.* (2007). They reported that no significant difference was observed between the male and female rabbits in the carcass trait studied. Hence, the variations in the reports of the different workers as to which sex is heavier may be as a result of differences in breeds and/or strains and rearing conditions (Fayeye and Ayorinde, 2008). Generation by housing system interaction effect on carcass quality traits is presented in Table 6. The shrunk body weight and empty carcass weight of the rabbits showed significant ($p<0.05$) interaction effect while no significant ($p>0.05$) generation by system effect was observed in the other parameters. Rabbits in the cage had higher values shrunk body weight and empty carcass weight in both generations. The values for the loins (201.75g and 167.50g) of rabbit in the cage and deep litter systems were the same in the two generations. The values for the tail, gastro intestinal tract, lungs and bile also followed the above trend. The rabbits reared on the floor had the same mean weight for head in the first and second generation and higher values for kidney in both generations

TABLE 6: Interaction effect of generation and housing system on carcass and organ parameters

	Generation 1		Generation 2		
Parameters	Cage	Deep litter	Cage	Deep Litter	SEM
Live weight (g)	1762.50	1507.50	1829.92	1746.50	30.75
Dressing percent (%)	79.61	74.64	81.12	76.96	3.05
SBW (g)	1712.50^{ab}	1455.00^{c}	1779.92^{a}	1696.00^{b}	28.56
ECW (g)	1403.18^{a}	1134.65^{b}	1481.87^{a}	1428.85^{a}	47.30
HCW (g)	851.19	676.90	840.80	698.76	35.48
Neck	40.33	42.00	45.58	48.08	2.74
Loins	201.75	167.50	201.75	167.50	13.75
Legs	406.00	297.42	386.67	322.58	18.82
Rack	221.33	198.58	219.58	171.83	14.31
Head	146.25	127.00	127.75	127.00	7.44
Shoulder	194.75	191.17	187.17	154.75	10.18
Tail	8.75	8.83	8.75	8.83	0.76
GIT	309.29	320.35	309.29	320.35	8.76
Lungs	14.75	11.75	14.75	11.75	1.09
Liver	54.08	52.00	60.92	56.17	3.69
Heart	4.25	4.00	6.17	5.25	0.49
Bile	0.83	1.00	0.83	1.00	0.17
Spleen	0.68	0.65	0.63	0.54	0.04
Kidney	11.42	13.58	12.17	21.50	2.83

a, b, c: Means on the same row with different superscripts are significantly different at ($p<0.05$)

Table 7 shows the interaction effect of generation by sex on the carcass quality traits or the experimental rabbits. There was no significant ($p<0.05$) interaction effect observed in all the parameters examined. The male rabbits recorded higher values than the females in both generations for dressing percentage, shrunk body weight, empty carcass weight and hot carcass weight. The mean weights for the loins and tails (189.00g and 9.50g) respectively were the same for the males and females in both generations and (180.25g and 8.08g), respectively. This trend was also observed in the gastro intestinal tract and bile. This table further shows that the mean weight for lungs (13.25g) was constant for both sexes in the two generations.

The interaction effect of housing system by sex on carcass quality traits in the first generation is presented in Table 8. Significant ($p<0.05$) interaction effect was observed for live weight, shrunk body weight and hot carcass weight. The caged female rabbits recorded the highest values for all the aforementioned parameters when compared to the male rabbits in the cage system and those in the deep litter system. Significant ($p<0.05$) interaction effect was observed in all the cut-up parts except the legs. All the relative weights of the organs did not show any significant

($p>0.05$) interaction effect except the heart which was significantly ($p<0.05$) affected. The interaction effect of housing system by sex on carcass quality traits in the second generation is presented in Table 9. The result followed the same trend as observed in the first generation. The male rabbits recorded higher values for the dressing percentage and empty carcass weight in both systems while the females recorded higher values for shrunk body weight in both systems and hot carcass weight in the cage system.

TABLE 7: Effect of generation and sex on carcass and organ parameters

	Generation 1		Generation 2		
Parameters	Male	Female	Male	Female	SEM
Live weight (g)	1670.00	1600.00	1794.25	1781.67	50.94
Dressing percent (%)	77.59	76.66	80.20	77.88	3.44
SBW (g)	1617.50	1550.00	1744.25	1731.67	32.29
ECW (g)	1304.32	1233.51	1492.43	1418.28	49.69
HCW (g)	771.33	756.76	770.68	768.88	43.34
Cut-up parts (expressed as % dressed weight)					
Neck	44.50	37.83	51.17	42.50	2.42
Loins	189.00	180.25	189.00	180.25	14.93
Legs	353.42	350.00	373.17	336.08	20.40
Rack	225.50	194.42	209.83	181.58	15.69
Head	146.50	126.75	135.00	117.75	6.91
Shoulder	199.17	186.75	184.00	157.92	11.54
Tail	9.50	8.08	9.50	8.08	0.74
Organ weight (expressed as % dressed weight)					
GIT	313.15	316.49	313.15	316.49	9.38
Lungs	13.25	13.25	13.25	13.25	1.16
Liver	60.00	46.08	62.67	54.42	3.33
Heart	4.67	3.58	5.58	5.83	0.51
Bile	0.98	0.85	0.98	0.85	0.17
Spleen	0.63	0.70	0.58	0.60	0.04
Kidney	13.42	11.58	13.92	19.75	2.99

TABLE 8: Effect of housing system and sex on carcass and organ parameters in first generation

	Cage		Deep Litter		
Parameters	Male	Female	Male	Female	SEM
Live weight (g)	1725.00^{a}	1800.00^{a}	1615.00^{b}	1400.00^{c}	87.70
Dressing percent (%)	79.49	79.73	75.68	73.59	1.94
SBW (g)	1675.00^{b}	1750.00^{a}	1560.00^{c}	1350.00^{d}	88.82
ECW (g)	1371.28	1435.07	1237.35	1031.95	94.57
HCW (g)	827.32^{a}	875.07^{a}	715.35^{b}	638.45^{c}	58.43
Cut-up parts (expressed as % dressed weight)					
Neck	40.00^{b}	40.67^{b}	49.00^{a}	35.00^{c}	3.62
Loins	177.00^{c}	226.50^{a}	201.00^{b}	134.00^{d}	16.80
Legs	396.00	416.00	310.83	284.00	24.54
Rack	211.17^{b}	231.50^{a}	239.83^{a}	157.33^{c}	18.30
Head	148.50^{a}	144.00^{a}	144.50^{a}	109.50^{b}	9.27
Shoulder	184.50^{c}	205.00^{b}	218.83^{a}	168.50^{d}	9.02
Tail	8.50^{b}	9.00^{b}	10.50^{a}	7.17^{c}	1.17
Organ weight (expressed as % dressed weight)					
GIT	303.65	314.93	322.65	318.05	18.08
Lungs	14.50	15.00	12.00	11.50	1.56
Liver	60.00	48.17	60.00	44.00	2.98
Heart	4.00^{b}	4.50^{b}	5.33^{a}	2.67^{c}	0.65
Spleen	0.70	0.65	0.55	0.75	0.09
Kidney	11.33	11.50	15.50	11.67	1.37

a, b, c: Means on the same row with different superscripts are significantly different at ($p<0.05$)

Furthermore, it is known that growth rate affects the development of tissues (Prud'hon *et al.*, 1970; Ouhayoun, 1998). In this study, the hind limbs and loins values were also higher in the cage- rabbits than the deep litter-housed rabbits. This may be attributed to fat deposit around these regions as reported by Fernadez and Fraga (1996). Taylor *et al.* (1989) also reported that the legs, loins and thigh form the major portions of the weight of the hind limbs, and they mature early and contain long bones. The hind limbs and loins have also been reported to be the most economically important portion of the carcass and also provide the greatest portion of edible meat in rabbits,

(Taylor *et al.*, 1989 and Fanimo *et al.*, 2003). The significant values observed for the legs and head (first generation) and legs, rack and shoulder (second generation) among rabbits in the cage could be due to the fact that these parts are late maturing parts of the body (Taylor *et al.*, 1989) while the other cut-up parts (such as the neck and tail) were not significantly different in the two housing systems.

TABLE 9: Effect of housing system and sex on carcass and organ parameters in second generation

	Cage		Deep Litter		
Parameters	Male	Female	Male	Female	SEM
Live weight (g)	1800.00^{a}	1859.83^{a}	1788.50^{a}	1703.50^{b}	42.55
Dressing percent (%)	82.50	79.73	77.90	76.02	2.05
SBW (g)	1750.00^{ab}	1809.83^{a}	1738.50^{b}	1653.50^{c}	48.79
ECW (g)	1495.33	1468.40	1489.53	1368.17	91.40
HCW (g)	797.47^{b}	884.13^{a}	743.90^{b}	653.62^{c}	64.76
Cut-up parts (expressed as % dressed weight)					
Neck	48.50^{b}	42.67^{c}	53.83^{a}	42.33^{c}	3.34
Loins	177.00^{c}	226.50^{a}	201.00^{b}	134.00^{d}	16.80
Legs	394.50	378.83	351.83	293.33	24.34
Rack	211.17^{a}	228.00^{a}	208.50^{a}	135.17^{b}	20.52
Head	125.50^{b}	126.00^{b}	144.50^{a}	109.50^{c}	9.27
Shoulder	184.50^{a}	189.83^{a}	183.50^{a}	126.00^{b}	17.37
Tail	8.50^{b}	9.00^{b}	10.50^{a}	7.17^{c}	1.18
Organ weight (expressed as % dressed weight)					
GIT	303.65	314.93	322.65	318.05	18.08
Lungs	14.50	15.00	12.00	11.50	1.56
Liver	66.00	55.83	59.33	53.00	5.24
Heart	5.50^{bc}	6.83^{a}	5.67^{b}	4.83^{c}	0.72
Spleen	0.62	0.65	0.53	0.55	0.05
Kidney	12.33	12.00	15.50	27.50	5.35

a, b, c: Means on the same row with different superscripts are significantly different at ($p<0.05$)

CONCLUSION

Sex had no significant effect on the growth parameters and carcass traits of the experimental rabbits. However, in slaughter results, males gave better results than females and some of the cut-up parts showed significant differences between the two sexes; the liver, neck, rack, head and shoulder were significantly higher in males than in females. Production of rabbits in the cage is recommended for enhanced slaughter results and carcass quality.

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