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RESEARCH ARTICLE

Economic Study of Litter Size in New Zealand White Rabbits

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Abstract

Rabbits are one of best source of meat producing animals because of the short generation interval, high productivity, and rapid growth. The study looked at the effect of litter size on productive traits, carcass characters and economic performance of post weaning rabbits. On the first day after kindling (d 0), the rabbits does were randomly assigned to one of the following three groups according to the litter size (number of kits): G1 (4-5), G2 (6-7), and G3 (8-9) kits in primiparous rabbit does then the growth rate, carcass traits and economic efficiency were determined. The litter size had no significant effect in feed intake (2330.00 ± 68.04, 2401.00 ± 58.42 and 2476.00 ± 66.72), but had significant increase in feed conversion rate (1.68 ± 0.07, 1.88 ± 0.11 and 2.01 ± 0.06), significant decrease in market rabbit weight (2071.50 ± 87.49, 1858.00 ± 58.38 and 1777.50 ± 51.32) for G1, G2 and G3, respectively. Significant increase in hot carcass weight (1468.50 ± 90.36, 1224.00 ± 47.81, 1171.50 ± 50.54) and chilled carcass weight (1468.50 ± 90.36, 1221.50 ± 47.73, 1170.00 ± 50.36) for G1, G2 and G3, respectively was also observed. Litter size had significant decrease in weaning body weight (657.20 ± 79.80, 578.00 ± 61.76, and 541.50 ± 63.01, respectively) among rabbits` groups. Litter size declared significant decrease in market body weight among rabbits groups, also has no significant effect in fixed (5.00 ± 0.00, 5.00 ± 0.00, 5.00 ± 0.00) variable (44.81 ± 0.37, 45.20 ± 0.32, 45.61 ± 0.37) and total costs **(**49.81 ± 0.37**,** 50.20 ± 0.32, 50.61 ± 0.37) for G1, G2 and G3, respectively. Litter size showed significance increase in total (84.08 ± 3.35, 75.57 ± 2.27, 72.35 ± 1.99) and net returns **(**34.27 ± 2.98, 25.37 ± 1.95, 21.74 ± 1.63) for G1, G2 and G3, respectively. We can conclude that the does have 4-5 litter size better than those have 6-7 and 8-9 litter size in productive performance, carcass characteristics and economic efficiency of rabbit production with lowering total cost and increase total and net returns in new Zealand white rabbit of current study.

Keywords: Rabbits, Production, Litter size, Market body weight, Economic efficiency

Introduction

The domestic rabbits have one of a good alternative source of dietary protein for increasing human population in developing countries. The rabbit meat properties are very high in protein, low in fat, triglyceride and cholesterol, low in energy value and have a mineral percentage higher than other meats produced as beef, weal and chicken meat [1].

Rabbits are a good source in production of meat due to the short generation interval, high productivity, rapid growth, adaptability in wide range of climatic condition, high roughage utilization potentiality, low in capital instruction and good quality, less level in cholesterol, are some of the features; the rabbits are suitable to either large scale or small scale/backyard production [2].

Maternal effect of rabbit determined by litter size and birth weight influences both growth and mortality in suckling and post weaning rabbits. Rabbits of larger litters generally have a lower weight at weaning than

the corresponding weight for rabbits of smaller litters [3] due to their weight gain depends on milk intake. Production of mother milk is positively related to the litter size [4, 5]. The high return of any rabbit production enterprise depend on the number of kits per litter [6] and survival kits from birth to weaning [7].

The digestive system of growing rabbits passes through many changes around the weaning stage, for example, anatomical change, growing of microbial fermentation, and maturation of the digestive enzymes and the immunity of rabbit. These changes can be significantly influenced by other factors such as weaning age and diet [8].

In feeding, the rabbit has an ability on both high concentrate ration and roughage with high efficiency than other animal in comparing [9].

The time surrounding weaning period is a very important for young rabbits because the healthy caecal microflora is not yet introduced [10], and is highly sensitive to several disorders of elementary tract [11].

Mostly, weaning of rabbits is from 30 days to 35 days of age [12]. The suckling time takes place in the early morning and continuing for 3–4.5 minutes [13].

This research was aimed to study the effect of litter size on productive performance, carcass traits and economic efficiency of post weaning rabbits.

Material and methods

This work was conducted at the Poultry and Research Farm, Faculty of Veterinary Medicine, Zagazig University. The study looked at the effect of litter size on productive traits, carcass characters and economic performance of post weaning rabbits. The Rabbits groups kept under the same environmental conditions from management, vaccinations, temperature and lighting. All experimental procedures were implemented according to the guidelines of the Animal Welfare and Research Ethics Committee at the Faculty of Veterinary Medicine, Zagazig University.

Rabbits, design and experimental diet

Thirty-five nulliparous New Zealand White does and 10 bucks (18 weeks old age) of body weights between 3100 gm/doe and 3200 gm/doe were used during the study. The rabbit does were obtained from a private company for rabbit production. Rabbits used for one generation. Artificial insemination (AI) was performed at 20 weeks of age to the method developed by Zöldág et al. [14]. At the first day after parturition (d0), rabbits` does were randomly assigned to one of the following three groups according to the litter size: 4-5, 6-7, and 8-9 kits in primiparous rabbit does. Rabbits weaned at 32 days after birth.

Accommodation and management

a. Housing

Each doe and their litter were reared in a galvanized wire cage (50 x 60 x 35cm) equipped with a nest box (35 x 30 x 45cm), feeder and a nipple drinker. The growing rabbits lived in wire cages (40 x 50 x 35cm) (3 rabbits/cage) in a closed building. Nest boxes were provided with rice straw at 4 to 5 days before parturition and at the 3rd week provided twice a week until weaning.

b. Temperature

All the experimental rabbits under study were kept under the same environmental, managerial and hygienic conditions. The temperature should be maintained between 18 and 23°C all over the experimental period.

c. Lighting

Experimental rabbits of the current study were provided with controlled lighting schedule of 12 hours light and 12 hours dark during the experimental period, except for the five days before and three days after artificial insemination, those should have a photoperiod of 16 hours light and 8 hours dark were concluded.

d. Vaccination

All does were vaccinated against bacterial and rabbit viral hemorrhagic diseases, from Abbassia – Cairo – Egypt. Vaccination by SERVAC Bivalent RHDV Gel Vaccine was administered as following: 0.5 mL subcutaneous for viral hemorrhagic diseases in neck of rabbits at two month of age after birth. In addition, SERVAC Formalized Polyvalent Rabbit Pasteurellosis Vaccine for bacterial

hemorrhagic diseases in rabbits, 2 mL subcutaneous in neck at one month of age after birth was given as the vaccine manufacturer's instructions. Aprophylactic dose of antibiotic and anticoccidial drugs were supplied to drinking water of growing rabbits after weaning for 3 to 5 day. In addition, vitamins AD_3E and vitamin E + selenium, mineral salts and calcium were supplied to post weaning rabbits.

In Table (1), there is the ingredients of one ton of ration used for feeding of rabbit as mentioned in following table, throughout the study all does and growing rabbits were fed on pelleted ration that was purchased from El qudes Company. The feed contained 18 % protein, 2.3% crude fat, 11 % crude fiber with a digestible energy of 2600 Kcal/kg.

Table (1) Experimental diet of post-weaning rabbits

Ingredient	Amount kg / diet
Hijazi clover (15%)	270
Bran 2 rows	221.5
Soya bean (44%)	180
Yellow corn	162.5
Coarse wheat bran	126
Dibasic calcium phosphate	22
Lime stone powder	7
methionine	4
Table salt	3
Mixture of vitamins and mineral mixture	3
Sodium bi carbonate	1
Calculation	1000

Evaluation of growth performance of post-weaning rabbits

I-Pre- weaning traits

Data collected were litter size at birth, litter birth weight, litter size at weaning, and litter weight gain at weaning.

II- Post-weaning traits

1. Body weights

After weaning, animals were weighed at 10 weeks of age (marketing age).

2. Feed intake

It was calculated by the difference between the weight of introduced feed and the remained part. The average daily feed consumption per rabbit was calculated as the total feed intake per day divided by the number of rabbits per cage.

3. Feed conversion ratio

The feed conversion ratio (FCR) was recorded according to Wanger and coauthors [15] by dividing the amount of feed consumed (g) per all period by the gain in the weight (g) per the same period.

4. Average body gain

The gain in body weight per study period was calculated by subtracting the body weight between two weaning weights and market rabbit weight. The average gain was calculated related to the number of days.

Evaluation of carcass traits of post-weaning rabbits

At the end of rearing period (10 weeks of age) from birth, five rabbits were randomly chosen from each group and weighed to the nearest gram before slaughtering.

1. Organs weights

Organs were weighed and their percentages were calculated relative to live body weight.

2. Dressing out percentage

The dressing percentage was calculated by expressing the dressed carcass weight as a percentage of live body weight as previously described [16].

$$\text{Dressing out \%} = \frac{\text{Hot carcass weight}}{\text{Live body weight}} \text{ X100}$$

3. Hot and chilled carcass weight

Hot weight: carcass weight was calculated with head, without any organs, 15-30 minutes after slaughter.

Chilled weight: carcass was kept at 4°C for 24 hours; then chilled carcass was weighed.

Economic analysis of collected data

The most important economic efficiency parameters studied include the following:

A) Cost parameters

The costs are classified into total fixed costs, total variable costs and total costs [17].

1. Variable costs (VC)

Included cost of ration, labor, veterinary care, energy and other miscellaneous costs.

2. Fixed costs (FC)

Calculation method implied by Sankhyan [18] was used for depreciation rates according the following equation:

* Value of building depreciation for each rabbits:

$$= \frac{\text{(Building Value (L.E.) / Years No / Cycles No / year}}{\text{Rabbits total No}}$$

*Value of equipment deprecation for each rabbits:

$$= \frac{\text{(Building value (L.E.) / Years No / Cycles No / year}}{\text{Total number of rabbits}}$$

3. Total costs (TC)

It was calculated from the summation of total fixed costs and total variable costs.

Total costs =FC + VC.

B) Return parameters

1. Total returns (TR)

It included returns from rabbit sales (body weight at marketing age X price of kg).

2. Net Profit

Calculation was implied as mentioned previously [19] using next equation:

Net profit = TR – TC.

Correlation matrix

Correlation matrix was estimated to show the correlation between the studied variables to determine the best input that introduced to the production and costs. According to Munro and coworkers [20], the correlation was classified into:

- High positive correlation: (over 0.50).
- Low negative correlation: (0: - 0.3).

Statistical analysis

Growing and economic collected data were analyzed using the computer programs SPSS/PC+ (2001) The statistical method was ANOVA test (one way analysis of variance) in a completely randomized design using a mixed model with [21] with a litter size as fixed effects and cycle or parity as repeated term.

The results were concluded at mean ± SEM. (standard error of mean). The value of $(P < 0.05)$ indicated a statistical difference.

Results

Effect of litter size on growth performance of pre-weaning and post-weaning rabbits

As shown in Table (2), a significant decrease in average birth weight (61.70 ± 3.04, 57.90 ± 0.79, and 52.20 ± 1.43), weaning body weight (657.20 ± 79.80, 578.00 ± 61.76, and 541.50 ± 63.01), weaning body weight gain (595.50 ± 76.76, 520.10 ± 60.97, and 489.30 ± 61.58) and market body weight (2071.50 ± 87.49, 1858.00 ± 58.38, and 1777.50 ± 51.32) were observed for G1, G2 and G3, respectively.

In addition, there is a significant increase in feed conversion rate (1.68 ± 0.07, 1.88± 0.11, and 2.01 ± 0.06) and non-significant increase in feed intake (2330.00 ± 68.04, 2401.00 ± 58.42, and 2476.00 ± 66.72) for G1, G2 and G3, respectively (Table 2).

Effect of litter size on carcass traits of post-weaning rabbits

In Table (3), a significant decrease in market body weight (2071.50 ± 87.49, 1858.00 ± 58.38, and 1777.50 ± 51.32), liver weight (60.50 ± 2.41, 56.00 ± 2.08, and 54.00 ± 1.25,) hot (1468.50 ± 90.36, 1224.00 ± 47.81, and 1171.50 ± 50.54) and chilled (1468.50 ± 90.36, 1221.50± 47.73, and 1170.00 ± 50.36) carcass weight for G1, G2 and G3 of the experiment, respectively.

Moreover, a significant decrease in kidney (12.50 ± 0.83 and 10.00 ± 0.00) and spleen (3.50 ± 0.17 and 3.00 ± 0.00) weight for G1 and G2 of rabbit groups, respectively. Non-significant differences in heart weight, perennial fat weight and organs percent proportion to market rabbit weight were noted for all groups of rabbits.

Effect of litter size on economic efficiency of rabbit production

Data showed in Tables 4 and 5 revealed that litter size have significant decrease in return (82.83 ± 3.85, 74.32 ± 2.27, and 71.10 ± 1.99) total return (84.08 ± 3.35, 75.57 ± 2.27, and 72.35 ± 1.99) and net return (34.27 ± 2.98, 25.37 ± 1.95, and 21.74 ± 1.63) for G1, G2 and G3 of rabbits, respectively. Non-significant differences in total fixed cost, total variable cost and total cost were also denoted

Table (2): Litter size effect on growth performance of post-weaning rabbits

Criteria	Groups (10 each)		
	G 1	G 2	G 3
Average birth weight/ g	61.70^{a} ± 3.04	57.90^{ab} ± 0.79	52.20^{b} ± 1.43
Weaning body weight/ g	657.20^{a} ± 79.80	578.00^{b}± 61.76	541.50^{c} ± 63.01
Weight gain/ g	595.50^{a} ± 76.76	520.10^{b}± 60.97	489.30^{c} ± 61.58
Market body weight/ g	2071.50^{a} ± 87.49	1858.00^{b} ± 58.38	1777.50^{b} ± 51.32
FI/ g	2330.00 ± 68.04	2401.00 ± 58.42	2476.00 ± 66.72
FCR	1.68^{c} ± 0.07	1.88^{b} ± 0.11	2.01^{a} ± 0.06

Means carrying different superscripts in the same row are significant different at ($P < 0.05$).
Means without superscripts in the same row are not significant different at ($P > 0.05$).
G (I) does have litter size 4-5 kits. G (2) does have litter size 6-7 kits. G (3) does have litter size 8-9 kits. FI, total feed intake during rearing period. FCR, feed conversion rate.

Table (3): Effect of litter size on carcass traits of post-weaning rabbits

Criteria	Groups (10 each)		
	G1	G2	G3
Market rabbit weight/ g	2071.50^{a} ± 87.49	1858.00^{b} ± 58.38	1777.50^{b} ± 51.32
Liver weight/ g	60.50^{a} ± 2.41	56.00^{ab} ± 2.08	54.00^{b} ± 1.25
Heart weight/ g	11.50 ± 0.76	11.50 ± 0.76	10.00 ± 0.00
Kidney weight/ g	12.50^{a} ± 0.83	10.00^{b} ± 0.00	13.00^{a} ± 1.11
Spleen weight/ g	3.50^{a} ± 0.17	3.00^{b} ± 0.00	3.50^{a} ± 0.17
Perennial fat weight/ g	9.00 ± 0.33	9.20 ± 0.33	9.00 ± 0.33
Periscapular fat weight/ g	10.00^{a} ± 0.00	9.00^{a} ± 0.33	6.50^{b} ± 0.50
Organs % proportion to market rabbit weight/g	4.44 ± 0.26	4.41 ± 0.07	4.76 ± 0.06
Dressing %	70.34^{a} ± 1.14	65.72^{b} ± 0.57	65.67^{b} ± 0.95
Hot carcass weight/ g	1468.50^{a} ± 90.36	1224.00^{b} ± 47.81	1171.50^{b} ± 50.54
Chilled carcass weight/ g	1468.50^{a} ± 90.36	1221.50^{b} ± 47.73	1170.00^{b} ± 50.36

Means carrying different superscripts in the same row are significant different at ($P < 0.05$). Means without superscripts in the same row are not significant different at ($P > 0.05$). G (I) does have litter size 4-5 kits. G (2) does have litter size 6-7 kits. G (3) does have litter size 8-9 kits.

Table (4): Effect of litter size on economic efficiency of post-weaning rabbits

z	Groups (10 each)		
	G 1	G 2	G 3
TFI gm/rabbit	2330.00 ± 68.04	2401.00 ± 58.42	2476.00 ± 66.72
TFI price/LE	12.81 ± 0.37	13.20 ± 0.32	13.62 ± 0.37
FC/ rabbit	5.00 ± 0.00	5.00 ± 0.00	5.00 ± 0.00
VC/ rabbit	44.81 ± 0.37	45.20 ± 0.32	45.61 ± 0.37
TC/ rabbit	49.81 ± 0.37	50.20 ± 0.32	50.61 ± 0.37
Market rabbit weight/g	2071.50^{a} ± 87.49	1858.00^{b} ± 58.38	1777.50^{b} ± 51.32
Price kg meat/ LE	40.00 ± 0.00	40.00 ± 0.00	40.00 ± 0.00
Return	82.83^{a} ± 3.85	74.32^{b} ± 2.27	71.10^{b} ± 1.99
Litter price/rabbit	1.25 ± 0.00	1.25 ± 0.00	1.25 ± 0.00
TR/ rabbit	84.08^{a} ± 3.35	75.57^{b} ± 2.27	72.35^{b} ± 1.99
NR/ rabbit	34.27^{a} ± 2.98	25.37^{b} ± 1.95	21.74^{b} ± 1.63

Means carrying different superscripts in the same row are significant different at *(P < 0.05)*. Means without superscripts in the same row are not significant different at *(P > 0.05)*.

G (I) does have litter size 4-5 kits. G (2) does have litter size 6-7 kits. G (3) does have litter size 8-9 kits.

TFI, total feed intake**.** FC total fixed cost. VC, total variable cost. TC, total cost. TR, total return. NR, net return.

Table (5): Simple correlation matrix between marketing rabbit weight (MRW), total feed intake (TFI), total cost (TC), return (R), total return (TR) and net return (NR)

Items	Market rabbit weight	Birth weight	Weaning weight	Total feed intake	Total cost	Return	Net return	Total return
Market rabbit weight	1.000							
Birth weight	+ 0.314^{ns}	1.000						
Weaning weight	+ 0.675**	+ 0.198^{ns}	1.000					
Total feed intake	+ 0.645**	- 0.125^{ns}	+ 0.495**	1.000				
Total cost	+ 0.645**	- 0.125^{ns}	+ 0.495**	+ 1.000**	1.000			
Return	+ 0.989**	+ 0.340^{ns}	+ 0.709**	+ 0.629**	+ 0.629**	1.000		
Net return	+ 0.981**	+ 0.383*	+ 0.699**	+ 0.547**	+ 0.547**	+ 0.995**	1.000	
Total return	+ 0.989**	+ 0.340^{ns}	+ 0.709**	+ 0.629**	+ 0.629**	+ 1.000**	+ 0.995**	1.000

** Highly significant at *(P < 0.05).*
* Significant at *(P > 0.05).*
ns = non-significant.

Discussion

Litter size has an important effect on productive performance and economic efficiency of white New Zealand rabbit's production. Herein, the litter size showed a significant effect on body weight gain and market rabbit weight, dressing percent, and hot and chilled carcass weight among experimental rabbit groups (G1, G2 and G3).

In addition, the litter size has a significant decrease in average birth weight, weaning body weight, weaning body weight gain and market body weight. Whereas, it has non-significant differences in feed intake.

From results obtained in Table (2) the litter size had no significant differences in feed intake *(P >0.05)* among rabbits groups. The abovementioned results disagree with Rommers et al. [22] who determined that there was significant differences in feed intake according to the litter size during the study period; does have litter size of 12 kits had the lowest *(P <0.05)* feed intake.

We noticed a significant increase in FCR *(P <0.05)* between the experimental groups to be 1.68± 0.07, 1.88± 0.11, 2.01± 0.06, respectively. The results disagree with Di Meo et al. **[**23] who stated that the kits at weaning group (KN8) always weighed more (966 vs. 894 vs. 888 g; P<0.01, respectively for groups KN8, KT6, KT8). After weaning, no parameter (daily weight gain, feed intake, feed conversion ratio, mortality and risk sanitary index) was affected by birth weight and litter size.

The results declared that the litter size had a significant decrease in average birth weight, weaning body weight, weaning body weight gain and market body weight ($P < 0.05$) among rabbits groups. The current results agree with Fayeye and Ayorinde [24] who reported that the body weight, body weight gain and market rabbit body weight were significantly *(P <0.05)* influenced by the weaning litter size. Mostly post-weaning body weight decreased with increasing weaning litter size.

Also, these results consistent with Ayoola et al. [25] who reported that the increase in litter size at birth was associated with significant ($P < 0.05$) decreased in live body weight of kits at birth, live body weight gain from birth to weaning and weight difference among litter mate at weaning.

From obtained data in Table (3), a significant decrease *(P < 0.05)* among rabbits groups in rabbit weight was observed at end of the experiment to be 2071.50±87.49, 1858.00±58.38 and 1777.50±51.32 for G1, G2 and G3, respectively.

Moreover, we reported that there was a significant decrease *(P < 0.05)* in dressing percent, hot and chilled carcass weights among rabbit groups; (G1) 70.34±1.14, 1468.50±90.36, and 1468.50±90.36, (G2) 65.72±0.57, 1224.00±47.54, and 1221.00±47.73 and (G3) 65.67±0.95, 1171.50±50.54, and 1170.00±50.36, respectively.

The present data counteract with Bérard et al. [26] who documented that the litter size had minor effect on growing traits, carcass characteristics and quality.

We reported that the litter size has a significant decrease *(P < 0.05)* in liver weight between rabbit groups as G1, 60.50±2.41 and G3, 54.00±1.25 but non-significant differences *(P > 0.05)* in liver weight between rabbit treated groups as G2 (56.00±2.08), G1 (60.50±2.41) and G3 (54.00±1.25). Of note, litter size has non-significant differences *(P >0.05)* in heart weight and perennial fat weight among rabbit groups (G1, 11.50±0.76, 9.00± 0.33; G2, 11.50±0.76, 9.20 ± 0.33 and G3, 10.00±0.00, 9.00 ± 0.33, respectively). Also, there was a significant decrease *(P < 0.05)* in periscapular fat weight among rabbit groups (G1, 10.00 ± 0.00; G2, 9.00 ± 0.33 andG3 6.50 ± 0.50). Moreover, the present data showed that there was a significant decrease *(P <0.05)* in kidney and spleen weight among rabbit groups (G2, 10.00±0.00, 3.00±0.17; G1, 12.50±0.83, 3.50±0. 17 and G3, 13.00±1.14, 3.50±0. 17 respectively). The abovementioned results disagree with Silva et al. [27] who demonstrated that litter size and weaning age did not influence ($P > 0.05$) the body weight, daily feed consumption, feed gain ratio and carcass characteristics at 84 days of age.

However, these results agree with Kuchtík et al. [28] who concluded that the litter size had a significant effect on carcass dressing percentage and the proportions of kidney and kidney fat of rabbits.

The collected data in Table (4) showed that there was non-significant differences among rabbit groups *(P > 0.05)* in TFI, FC, VC, and TC among experimental rabbit groups. On the other hand, litter size has a significant decrease *(P < 0.05)* in market rabbit weight among rabbit groups (G1, 2071.50 ± 87.49, G3, 1777.50 ± 51.32), return (G1, 82.83 ± 3.85, G3, 71.10 ± 1.99), total return (G1, 84.08 ± 3.35, G3, 72.35 ± 1.99) and net return (G1, 34.27 ± 2.98, G3, 21.74 ± 1.63)

The results agree with Mahunguane et al. [29] who recommended that a reduction in litter size from 8 to 4 will improve profit between 13.8% feeding (on pellet diets) and 9.5% (on mixed diet).

The data in Table 5 showed a positive correlation matrix between market rabbit weight and weaning weight (+.675), total feed intake (+.645), total cost (+.645), total return (+.989) and net return (+.981). A positive correlation matrix was found between birth weight and net return (+.383). High positive correlation matrix was found between weaning weight and total feed intake (+.495), total cost (+.495), total return (+.709) and net return (+.699). High positive correlation matrix was found between total feed intake and total cost (+1.000), total return (+.629) and net return (+.547). A high positive correlation matrix was found between net return and total return (+.995).

These results Agree with previous studies [30-32], where classified the correlation matrix into low positive, medium positive, high positive, low negative, medium negative and high negative.

Conclusion

We can conclude that the does have 4-5 litter size are better than those have 6-7 and 8-9 litter size in productive performance, carcass characteristics and economic efficiency of rabbit production with lowering total cost and increase total and net return in New Zealand white rabbit production.

Conflict of interest

The authors have no conflict of interest.

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الملخص العربي

دراسة إقتصادية على عدد الخلفة فى الأرانب النيوزيلاندى الأبيض

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تعتبر الأرانب الأفضل لإنتاج اللحوم بسبب قصر فترة الإنتاج والإنتاجية العالية والنمو السريع. تناولت الدراسة تأثير عدد الخلفة على الأداء الإنتاجي وخصائص الذبيحة والكفاءة الاقتصادية لنمو الأرانب.

أجريت هذه الدراسة فى مزرعة بمحافظة الشرقية لدراسة تاثير عدد الخلفة علي الصفات الإنتاجية وصفات الذبيحة والكفائة الإقتصادية للأرانب ،وأجريت التجربه على35 أرانبة بكارا و10 ذكور وتم تلقيح الأمهات البكارا وتسجيل تاريخ التلقيح لكل أرنبة وتاريخ الولادة لكل أم وتم تقسيم الأمهات تبعا لعدد الخلفات إلي ثلاث مجاميع مجموعة أولى عدد الخلفة من 4 الى 5 مجموعة ثانية عدد الخلفة من 6 الى 7 ومجموعة ثالثة عدد الخلفة من 8 الى9 وتم قياس معدلات النمو ، وصفات الذبيحة والكفاءة الاقتصادية .

لوحظ أن عدد الخلفة ليس له تأثير معنوي في كمية العلف المستهلكة للأرنب 66.72± 2476.00, 58.42±2401.00, 68.04±2330.00 . لوحظ وجود زيادة معنوية في معدل التحويل الغذائي 0.07 ± 1.68, 0.11 ±1.88 , 0.06 ±2.01 .لوحظ وجود نقص معنوي في الوزن النهائي للأرنب (وزن التسويق) 87.49±2071.50, 58.38±1858.00, 51.32±1777.50. وجد ايضاً زيادة معنوية في وزن الذبيحة الساخنة 90.36±1468.50, 47.81±1224.50, 50.54±1171.00. والمبردة 90.36±1468.50, 47.73±1221.50, 50.36 ±1170.00. لوحظ وجود نقص معنوي في وزن الجسم عند الفطام 79.80±657.20 , 61.76±578.00, 63.01±541.50 وتوجد فروق ذات دلالة إحصائية في إجمالي التكلفة الثابتة 0.00 ± 5.00, 0.00 ± 5.00, 0.00 ± 5.00 والتكلفة الإجمالية المتغيرة 0.37±44.81, 0.32±45.20, 0.37±45.61 والتكلفة الإجمالية 037±50.61, 0.32±50.20 , 0.37±49.81 ، والعائد الإجمالي وصافي العائد 3.35±84.08 , 2.27±75.57 , 1.99±72.35 بين مجموعات الأرانب G3, G2, G1 بالترتيب.

يمكن أن نستنتج ان الأمهات التي انتجت 4-5 خلفة أفضل من التي أنتجت 6-7 و 8-9 خلفة في الصفات الإنتاجية وصفات الذبيحة والكفائة الإقتصادية للأرانب النيوزيلاندي الأبيض.