

## PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF NZW RABBITS FED RATIONS CONTAINING PEANUT VINES

### *2- Fertility and semen characteristics*

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### SUMMARY

This work was designed to study the reproductive performance, physical semen characteristics and economical efficiency for New Zealand White (NZW) rabbits fed diets containing peanut vines hay (PNVH) or peanut vines silage (PNVS), which replaced different levels (0, 50, 75 and 100%) of clover hay (CH) in the mixed rations. Fifty-six (42 does + 14 bucks) NZW rabbits 22 weeks old with an average live body weight of 2.8 to 3.0 kg were used. Seven equal groups (6 females + 2 males) of rabbits were allotted to the different experimental rations. During reproductive period, does and bucks were housed separately in individual cages. Conception rate, litter size at birth and bunny weight at 14, 21, 28 and 35 day were determined. Semen was collected 3 times during the last month of experiment through the artificial vagina. Some semen characteristics were examined. The results for the first kindling indicated that, average conception rate for NZW does ranged from 83.33 to 100.00%, while, average of bunny weight gain at 35 days (at weaning) ranged from 25.14 to 32.14 g/day and mortality percentage during all period ranged from 9.53 to 24.77%, with significant differences ( $P < 0.05$ ). In the second kindling, reproductive performance decreased compared with the first kindling. The differences in doe and offspring traits were not significant except for bunny weight at birth, weight gain at 21 and 28 days of age which were significant ( $P < 0.05$ ) among dietary treatments. Mortality percentage was higher compared with the first kindling. The results of semen characteristics indicated that, ejaculate volume, sperm motility, pH value and sperm concentration were not significant ( $P < 0.05$ ) for bucks fed rations which contained different levels of PNV as hay or silage. Concerning the economical efficiency of reproductive performance, the rabbits fed R7 (containing 100% PNVS) recorded the highest values for economical efficiency and relative economic efficiency as compared to control (713.20 and 177.57%, respectively), with significant differences ( $P < 0.05$ ) among treatments.

**Keywords:** *peanut vines, rabbits, reproductive performance, economical efficiency.*

### INTRODUCTION

The continuous increase in human population together with raising their standards of living resulted in continuous increasing demands of animal

products, such as meat, eggs and milk. Rabbit's meat is usually more preferable to consumer. Moreover, rabbit has much higher relative growth rate than either sheep or cattle. In addition, rabbits are able to consume forages and agricultural by-products containing high levels of fiber (Cheeke, 1987; Malhate, 1992 and Gad-Alla, 1997).

Many nontraditional agricultural by-products are used as alternative forages in feeding animals. In this respect, peanut vines as an example of such materials that could partially or completely replace clover hay in rabbit rations. In Egypt, the peanut crop is cultivated in marginal farming areas. Recently about 150767 feddans are dedicated to peanut production in Egypt (Ministry of Agricultural, March 2002). Therefore, peanut vines are produced in large quantities as green residues at harvesting time; four tons of peanut vines are produced per feddan. The peanut vines could be considered as a nontraditional feed for ruminants. Rabbits can use roughages in their rations due to their ability to induce some fermentation in hindgut, which enable them to use fibrous feeds.

The present study was conducted to study the reproductive performance (conception rate, litter size and litter weight and gain) and offspring traits (mean bunny weight, daily weight gain and mortality percentage from birth till weaning at 35 days. Semen characteristics of male rabbits, were also studied in terms of volume, color, mobility and viability of New Zealand White rabbits as affected by replacements of clover hay at different levels by peanut vines as hay or silage in the mixed ration. Economical efficiency was also investigated.

## **MATERIALS AND METHODS**

The present study was carried out at Sakha Animal Production Research Laboratories and Station, Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture in co-operation with Department of Animal Production, Faculty of Agriculture, Kafrelsheikh University. This work was designed to study the reproductive performance, physical semen characteristics and economical efficiency of New Zealand White (NZW) rabbits as affected by inclusion of peanut vines hay (PNVH) or peanut vines silage (PNVS), which replaced different levels of clover hay (CH) in the mixed rations.

The peanut green foliage was purchased from local farms at Behaira Governorate. After harvesting the peanut vines were prepered as discribed by Eweedah et al. (2007).

### **1- Rabbits:**

Fifty-six (42 does + 14 bucks) NZW rabbits 22 weeks old with an average live body weight of 2.8 to 3.0 kg were taken from the experiment of

growing rabbits carried out by Eweedah et al. (2007). Seven equal groups (6 females + 2 males) of rabbits were allotted to experimental doe rabbit rations that suitable for productive stage (Table 1 and 2) and were within the range recommended by NRC (1977).

**Table (1): Ingredients composition of experimental rations of does rabbits.**

Ingredients %	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>
	Control	50%	75%	100%	50%	75%	100%
Clover hay	40.00	20.00	10.00	00.00	25.00	14.29	00.00
Peanut vines hay	00.00	20.00	30.00	40.00	00.00	00.00	00.00
Peanut vines silage	00.00	00.00	00.00	00.00	20.00	30.00	40.00
Barley grain	16.00	16.00	16.00	16.00	20.00	22.86	26.70
Yellow corn	15.00	15.00	15.00	15.00	18.75	21.43	25.00
Soybean meal (44%)	18.20	18.20	18.20	18.20	22.75	26.00	30.33
Wheat bran	7.00	7.00	7.00	7.00	8.75	10.00	11.65
Molasses	3.00	3.00	3.00	3.00	3.75	4.28	5.00
Sodium chloride	00.25	00.25	00.25	00.25	00.31	00.36	00.40
Minerals and vit. Mix*	00.30	00.30	00.30	00.30	00.38	00.43	00.50
DL-Methionine	00.15	00.15	00.15	00.15	00.19	00.21	00.25
Anti-Toxin (mold-Trex)	00.10	00.10	00.10	00.10	00.12	00.14	00.17
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

\*Minerals and vitamins mixture premix manufactured by Egypt Company for Chemical & Pharmaceuticals (ADWIA). Each 2.5 kg contains: Vit. A 12000000 IU; vit. D<sub>3</sub> 2000000 IU; vit. E 110000 mg; vit. B<sub>1</sub> 1000 mg; vit. B<sub>2</sub> 4000 mg; Niacin 20000 mg; vit. Pantothenic acid 10000 mg; vit. B12 10 mg; vit. K3 2000 mg; Folic acid 1000 mg; vit B6 1500 mg; Biotin 50 mg; Copper 10 gm; Iron 30 gm; Iodine 1000 mg; Manganese 55 gm; Selenium 100 gm; Zinc 55 gm; Choline chloride 500 gm; Ethoxyquine 3000 mg.

R1. Control 40% clover hay.

R2. 50% of CH was replaced by PNVH.

R3. 75% of CH was replaced by PNVH.

R4. 100% of CH was replaced by PNVH

R5. 50% of CH was replaced by PNVS\*\*

R6. 75% of CH was replaced by PNVS.

R7. 100% of CH was replaced by PNVS.

\*\* Silage was offered separately on dry matter basis with dry feed mixture to obtain the dry matter intake, whereas, 20, 30, 40% of peanut vines silage was replaced on dry mater basis for R5, R6 and R7, respectively.

**2- Housing and management:**

During reproductive period, does and bucks were housed separately in individual cages. Batteries were provided with external nests. All batteries were located in naturally ventilated house.

**3- Mating design:**

At mating, each doe was transferred to the buck cage of the same group and returned to her cage after mating. All does were pulpatud 10 days post-mating to determine pregnancy and mating was repeated in case of

failure. Conception rate, litter size at birth and bunny weight at 14, 21, 28 and 35 days were determined. Bunny weight gain was calculated.

**Table (2): Chemical analysis of clover hay, peanut vines hay, peanut vines silage and experimental rations of does rabbits.**

Rations	DM%	DM composition, %					
		OM	CP	EE	CF	NFE	Ash
Clover hay	88.0	89.86	14.26	2.36	30.56	42.68	10.14
Peanut vines hay	89.0	89.00	13.54	3.48	23.72	48.26	11.00
Peanut vines silage*	39.20	87.61	14.49	3.30	23.05	46.77	12.39
Experimental rations (% on DM basis)							
Ration (1) control	90.76	93.41	18.20	3.45	15.42	56.34	6.59
Ration (2)	88.01	93.24	18.06	3.72	14.06	57.40	6.76
Ration (3)	88.61	93.16	18.00	3.83	13.37	57.96	6.84
Ration (4)	88.10	92.40	17.92	3.94	12.69	57.85	7.60
Ration (5)	79.39	92.29	18.25	3.68	13.92	56.44	7.71
Ration (6)	73.83	92.07	18.27	3.78	13.17	56.85	7.93
Ration (7)	69.06	91.84	18.30	3.87	12.42	57.25	8.16

\*Parameters of PNVS quality were, pH 4.4, total VFA's 3.44% of DM, lactic acids 4.14% of DM, NH<sub>3</sub>-N of total nitrogen 6.47%, acetic acid 33.66%, propionic acid 3.24%, butyric acid 2.78%, isobutyric acid 0.14%, valeric acid 1.53% and isovaleric acid 1.02%.

#### **4- Semen collection:**

Buck groups were fed experimental ration until 8 months of age. Semen was collected 3 times during the last month of experiment through artificial vagina. Ejaculate volume was measured in milli-liters by calibrated pipette. Semen pH was measured using pH comparative paper ranging from 6.5 to 8.5. Sperm motilities (%) were measured using light microscope. Sperm-cells concentration was determined using a photometer (SDM4). Percentage of abnormal and dead sperms were examined according to Smyth and Gordan (1967).

#### **5- Economical efficiency:**

Economical efficiency was expressed as the ratio between the price of offspring (for two kindlings) and the price of feed consumed for the doe and her offsprings. The average market price was 12.0 LE for each weaned rabbit.

Economical efficiency =

$$\frac{\text{Price of total weaned of offsprings/doe} - \text{feed cost of doe and her offsprings}}{\text{Feed cost of doe and her offsprings}} \times 100$$

#### **6- Statistical analysis:**

The data were statistically analyzed using general linear models procedure adapted by SPSS (1997) for user's Guide, with one-way ANOVA model was used in the data of experiment and appropriate means were separated using Duncan's multiple range test (Duncan, 1955).

## RESULTS AND DISCUSSION

### Reproductive performance:

#### 1- Does and offspring traits (A- First kindling):

Data of the first kindling are showed in Table (3) and Fig. (1, 2 and 3). Generally, higher live weights of does were obtained from rabbits fed rations containing PNVH compared with those fed PNVS. Average of conception rate ranged from 83.3 to 100%. Rabbits fed rations R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>7</sub> showed the highest rate (100%), while the lowest rate was in R<sub>1</sub>, R<sub>5</sub> and R<sub>6</sub> (83.30%). These results are in agreement with those of Gad-Alla (1997) who found that the conception rate ranged from 58.3 to 100% in female rabbits fed rations containing some of agriculture by-products (carrot-tops, leaves of bread bean, squash, cucumber and cowpea). Abd El-Hady et al. (1999) found no significant differences of conception rate in rabbits fed rations containing silages of sugar beet tops and berseem, the values ranged from 61.5 to 63.90%.

Differences in average litter size and litter weight at birth were significant ( $P<0.05$ ), being higher for does in R<sub>4</sub> than the other groups, while the average of bunny weight at period from 14 to 28 days of age showed no significant differences. These results were similar to those obtained by Gad-Alla (1997). The present results showed significant differences ( $P<0.05$ ) of bunny weight gain/day at 35 days of age which ranged from 25.14 (R<sub>7</sub>) to 32.14 g (R<sub>3</sub>) as shown in Table (3). Sarhan (1995) found that litter size and litter weight were significantly ( $P<0.05$ ) affected by feeding rations containing soybean meal, cotton seed meal, molasses yeast, sunflower meal and mixed diet.

The mortality rate % during all periods were significant ( $P<0.05$ ) and ranged from 9.53 (R<sub>5</sub>) to 24.77 (R<sub>3</sub>). The bunny weight at birth, 21 and 28 days of age and mortality rate % were within the range obtained by Gad-Alla (1997), Zajac et al. (1998), DeBlas et al. (1999), Abd El-Hady et al. (1999) and Makled et al. (2003).

**Table (3): Reproductive performance for female NZW rabbits of the first kindling as affected by dietary treatments.**

Items	Dietary treatments							MSE
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	
Number of does	6	6	6	6	6	6	6	
Average doe weight (kg)	2.990 <sup>ab</sup>	3.025 <sup>ab</sup>	2.860 <sup>ab</sup>	3.087 <sup>a</sup>	2.740 <sup>bc</sup>	2.800 <sup>abc</sup>	2.530 <sup>c</sup>	0.03
Conception rate %	83.30	100.00	100.00	100.00	83.30	83.30	100.00	0.70
Average of litter size/doe	8.00 <sup>ab</sup>	8.17 <sup>ab</sup>	8.17 <sup>ab</sup>	8.67 <sup>a</sup>	7.17 <sup>bc</sup>	6.33 <sup>c</sup>	7.67 <sup>abc</sup>	0.16
Average bunny weight at birth (g)	45.00 <sup>b</sup>	58.00 <sup>ab</sup>	59.67 <sup>ab</sup>	73.33 <sup>a</sup>	59.00 <sup>ab</sup>	65.33 <sup>a</sup>	61.00 <sup>ab</sup>	2.28
Average bunny weight gain/day at 14 days (g)	8.36	8.86	8.50	9.64	8.14	7.86	8.07	0.37
Average bunny weight gain/day at 21 days (g)	13.86	11.43	11.71	8.29	10.00	10.86	12.57	0.68
Average bunny weight gain/day at 28 days (g)	20.00	17.57	16.57	19.14	14.00	17.71	17.86	1.29
Average bunny weight gain/day at 35 days (g)	28.86 <sup>bc</sup>	31.43 <sup>ab</sup>	32.14 <sup>a</sup>	31.86 <sup>a</sup>	29.43 <sup>ab</sup>	26.43 <sup>cd</sup>	25.14 <sup>d</sup>	0.32
Mortality percentage during all periods	14.49 <sup>b</sup>	16.28 <sup>ab</sup>	24.77 <sup>a</sup>	17.36 <sup>ab</sup>	9.53 <sup>b</sup>	10.32 <sup>b</sup>	15.14 <sup>ab</sup>	1.12

<sup>a, b, c, d</sup> Means in the same row with different letters differ significantly ( $P < 0.05$ ).

R<sub>1</sub> = Control (40% clover hay)

R<sub>2</sub> = 50% of clover hay was replaced by peanut vines hay.

R<sub>3</sub> = 75% of clover hay was replaced by peanut vines hay.

R<sub>4</sub> = 100% of clover hay was replaced by peanut vines hay.

R<sub>5</sub> = 50% of clover hay was replaced by peanut vines silage.

R<sub>6</sub> = 75% of clover hay was replaced by peanut vines silage.

R<sub>7</sub> = 100% of clover hay was replaced by peanut vines silage.

Fig. (1): Average of litter size/doe for NZW females rabbits of the first kindling as affected by experimental dietary treatments

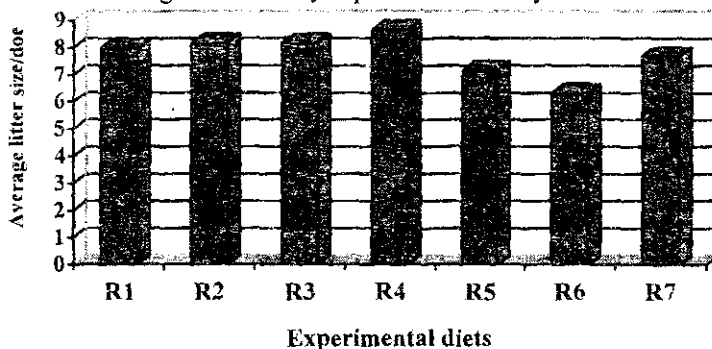


Fig. (2): Growth performance of bunny of NZW female rabbits of the first kindling as affected by different experimental dietary treatments

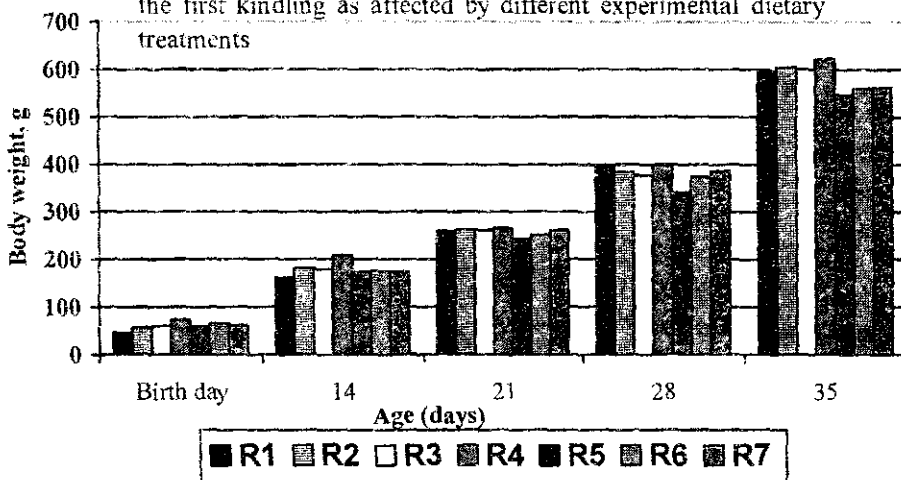
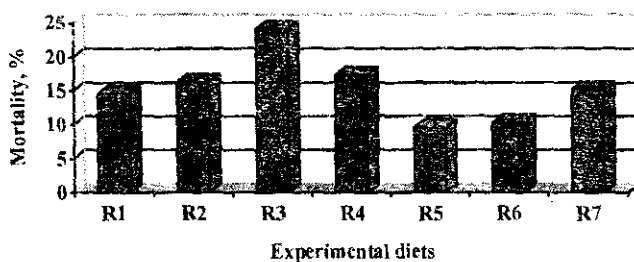


Fig. (3): Mortality percentage of bunny of NZW female rabbits during the first kindling as affected by experimental dietary treatments



**B- Second kindling:**

Data of reproductive performance for NZW female rabbits of the second kindling as affected by dietary treatments are presented in Table 4 and Fig. 4,5 and 6. The results revealed that there were no significant differences in conception rate and average litter size per doe and the values ranged from 66.7 to 100% and 6.33 to 7.67, respectively. But, there were significant differences ( $P<0.05$ ) of the bunny weight at birth (52.0-67.7 g), bunny weight gain at 21 days (9.00-15.57 g) and 28 days of age (9.71-16.71 g). However, average bunny weight gain at 35 days of age increased compared with previous periods and the values ranged from 25.86 (control) to 29.14 g ( $R_4$ ), without significant differences.

Concerning the mortality percentage during all periods, the rate was high compared with the first kindling, this may be due to high of temperature during July and August months at the end of the experiment.

**2- Physical semen characteristics:**

Physical semen characteristics of fourteen NZW buck rabbits fed rations containing PNVH or PNVS at different levels are shown in Table (5). Results showed that volume ranged between 0.45 ( $R_5$ ) and 1.50 ml ( $R_1$ ) without significant differences. Zajac et al. (1998) reported that full ejaculate, ranged between 0.4 to 3.2 ml using NZW rabbits, while Gad-Alla (1997) found that ejaculate volume ranged between 0.41 to 0.99 ml with significant differences ( $P<0.05$ ) when rabbits were fed rations containing different levels of agriculture by-products.

The percentage of sperm motility ranged between 52.5 to 87.5% while no significant differences were found between the different dietary treatments. Values of semen pH ranged between 7.55 and 8.0 without significant differences, these values were higher than those obtained by Makled et al. (2003) who found that values of semen pH ranged between 6.4 and 6.7.

Rabbits fed rations  $R_5$  showed the highest value of sperm concentration ( $509.0 \times 10^6$ /ml) compared with the control ( $389.0 \times 10^6$  /ml); these results were similar to those recorded by Zajac et al. (1998), but higher than that obtained by Gad-Alla (1997) and Makled et al. (2003).

Rabbits fed ration  $R_4$  showed the lowest percentage of dead spermatozoa (6.00%) followed by those in  $R_6$  (10.00 %) compared with the control (14.00%) and  $R_5$  (15.00%). Gad-Alla (1997) reported that dead spermatozoa ranged between 11.0 to 17.0%, also, Makled *et al.* (2003) found that dead spermatozoa ranged from 14.10 to 18.40% using NZW rabbits. The present results showed also that dead spermatozoa ranged from 6.0 to 15% with significant differences ( $P<0.05$ ) as shown in Table (5).



**Table (4): Reproductive performance for female NZW rabbits of the second kindling as affected by dietary treatments.**

Items	Dietary treatments							MSE
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	
Conception rate %	83.30	83.30	100.00	100.00	66.70	100.00	83.00	2.08
Average of litter size/doe	7.33	7.00	7.17	7.67	6.33	7.00	6.33	0.19
Average bunny weight at birth (g)	52.00 <sup>b</sup>	54.33 <sup>b</sup>	62.00 <sup>ab</sup>	67.67 <sup>a</sup>	56.00 <sup>ab</sup>	61.0 <sup>ab</sup>	58.33 <sup>ab</sup>	1.44
Average bunny weight gain/day at 14 days (g)	7.93	9.57	9.36	9.43	7.93	7.64	8.00	0.30
Average bunny weight gain/day at 21 days (g)	14.71 <sup>a</sup>	15.57 <sup>a</sup>	13.43 <sup>ab</sup>	11.00 <sup>ab</sup>	9.00 <sup>b</sup>	11.29 <sup>ab</sup>	12.57 <sup>ab</sup>	0.57
Average bunny weight gain/day at 28 days (g)	16.52 <sup>ab</sup>	9.71 <sup>d</sup>	12.29 <sup>cd</sup>	16.71 <sup>a</sup>	12.86 <sup>bcd</sup>	16.43 <sup>ab</sup>	15.57 <sup>abc</sup>	0.43
Average bunny weight gain/day at 35 days (g)	25.86	28.81	27.14	29.14	28.86	26.57	26.86	1.08
Mortality percentage during all periods	20.24	23.81	20.56	19.44	20.64	19.17	20.64	1.51

<sup>a, b, c, d</sup> Means in the same row with different letters differ significantly ( $P < 0.05$ ).

R<sub>1</sub> = Control (40% clover hay).

R<sub>3</sub> = 75% of clover hay was replaced by peanut vines hay.

R<sub>5</sub> = 50% of clover hay was replaced by peanut vines silage.

R<sub>7</sub> = 100% of clover hay was replaced by peanut vines silage.

R<sub>2</sub> = 50% of clover hay was replaced by peanut vines hay.

R<sub>4</sub> = 100% of clover hay was replaced by peanut vines hay.

R<sub>6</sub> = 75% of clover hay was replaced by peanut vines silage.

Fig. (4): Average of litter size/doe of NZW female rabbits of the second kindling as affected by experimental dietary treatments

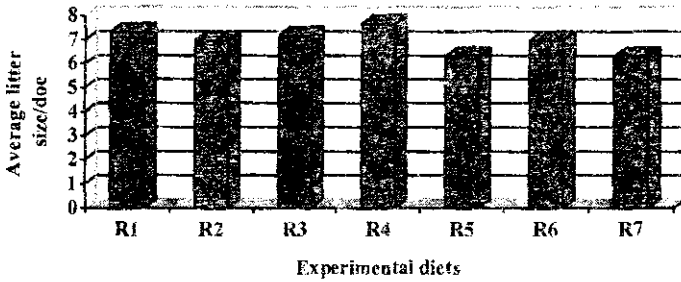


Fig. (5): Growth performance of bunny of NZW female rabbits of the second kindling as affected experimental dietary treatments

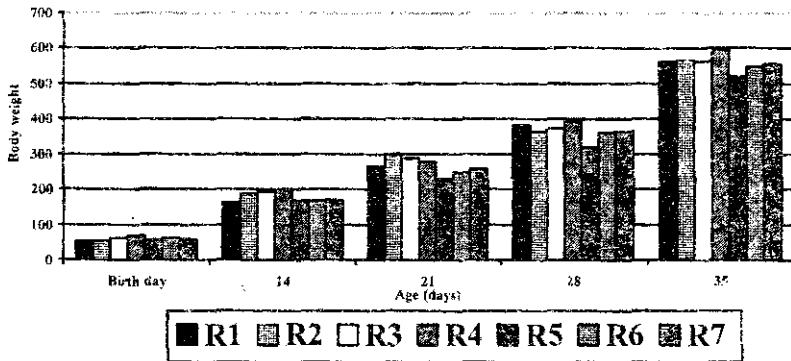
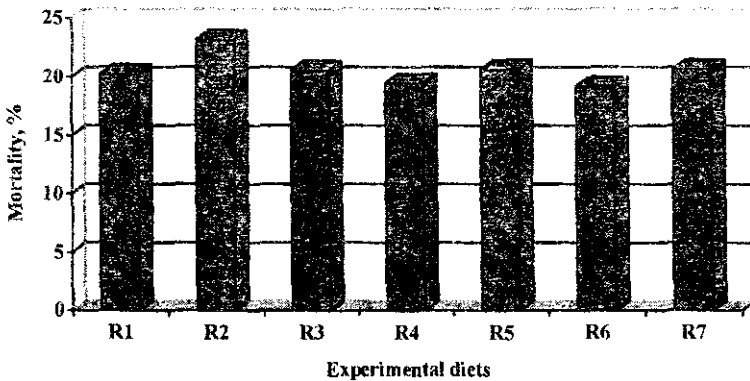


Fig. (6): Mortality percentage of bunny of NZW female rabbits during the second kindling as affected by experimental dietary treatments



**Table (5): Semen characteristics of male NZW rabbits as affected by dietary treatments.**

Items	Dietary treatments							MSE
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	
Number of collection	3	3	3	3	3	3	3	
Ejaculate volume (ml)	1.5	0.80	0.65	0.85	0.45	0.65	0.85	0.08
Semen pH	7.90	8.0	7.55	7.60	7.90	7.80	7.55	0.08
Sperm motility (%)	72.50	75.0	84.00	87.50	75.00	75.00	52.50	4.05
Dead spermatozoa (%)	14.0 <sup>ab</sup>	11.5 <sup>ab</sup>	10.5 <sup>ab</sup>	6.0 <sup>b</sup>	15.0 <sup>a</sup>	10.0 <sup>ab</sup>	12.0 <sup>ab</sup>	0.85
Sperm concentration (x10 <sup>6</sup> /ml)	389.0	423.5	446.5	483.0	509.0	406.5	447.5	19.70

<sup>a, b</sup> Means in the same row with different letters differ significantly (P<0.05).

**3- Economical efficiency of reproductive performance of female rabbits:**

Average weaning bunny number per doe through the two kindlings ranged between 11.33 (R6) and 13.33 (R4) bunny with no significant differences (Table 6).

The present results indicated that the economical efficiency ranged from 401.7 to 713.2%, the highest value was noticed in rabbits fed ration 7 containing PNVS which CH replaced completely, compared with rabbits fed the control diet (401.7%) the lowest value, with high significant differences (P<0.05) between the different dietary treatments. Moreover, the relative economic efficiency to control showed that R7 had the highest value (177.6%) followed by R<sub>6</sub> (133.6%) and R<sub>4</sub> (125.8%) with high significant differences (P<0.05) between the dietary treatments.

Comparing the percentage of feed cost for doe and her offspring until weaning with control, indicated that the low percentage (more efficiency) was in R<sub>7</sub> (56.01% of control), and high percentage (less efficiency) was in R<sub>3</sub> (93.33% of control) as shown in Table (6).

The present results encourage using peanut vines as hay or silage up to 100% replacement of clover hay for feeding growing and does rabbits to improve their reproductive performance as well as economical efficiency along with a decrease in the cost of feeding as compared with feeding clover hay.

**Table (6): Economical efficiency of reproductive performance of female NZW rabbits of two kindlings as affected by dietary treatments.**

Items	Dietary treatments							SEM
	R1	R2	R3	R4	R5	R6	R7	
Average weaning bunny number	12.67	12.83	11.83	13.33	11.50	11.33	11.50	0.22
Total revenue (LE)	152.0	154.0	142.0	160.0	138.0	136.0	138.0	2.70
Feed conversion (kg DM/doe and offspring)	29.83	30.01	29.96	30.71	30.54	31.87	30.23	0.34
Feed cost (LE/head and offspring)	30.30 <sup>a</sup>	28.28 <sup>ab</sup>	26.93 <sup>b</sup>	26.43 <sup>b</sup>	23.58 <sup>c</sup>	21.36 <sup>d</sup>	16.97 <sup>c</sup>	0.26
Net revenue (LE/head)	121.7	125.7	115.1	133.6	114.4	114.6	121.0	2.50
Economical efficiency (%)	401.7 <sup>c</sup>	444.6 <sup>bc</sup>	427.3 <sup>dc</sup>	505.4 <sup>bc</sup>	485.2 <sup>bcd</sup>	536.7 <sup>b</sup>	713.2 <sup>a</sup>	8.30
Relative economical efficiency to control	100.0 <sup>c</sup>	110.7 <sup>abc</sup>	106.4 <sup>dc</sup>	125.8 <sup>bc</sup>	120.6 <sup>bcd</sup>	133.6 <sup>b</sup>	177.6 <sup>a</sup>	2.09
Relative feed cost/ control	100.0	93.33	88.88	87.23	77.82	70.50	56.01	

<sup>a, b, ..., c</sup> Means in the same row with different letters differ significantly ( $P < 0.05$ ).

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## الملخص العربي.

الأداء الإنتاجي والتناسلي للأرانب النيوزيلندي المغذاة على علائق تحتوي على عروش الفول السوداني  
٢ - الخصوبة وصفات السائل المنوي

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اجريت هذه التجربة لدراسة تأثير استخدام عروش الفول السوداني في صورة دريس أو سيلاج بدلا من دريس البرسيم بنسب مختلفة (صفر، ٥٠، ٧٥، ١٠٠%) في علائق الأرانب النيوزيلندي علي الأداء التناسلي وصفات السائل المنوي والكفاءة الاقتصادية للأرانب النيوزيلندي. استخدم في هذه التجربة ٥٦ من الأرانب النيوزيلندي (٤٢ أنثى، ١٤ ذكر) عمرها ٢٢ أسبوع ومتوسط وزنها ٢,٨ - ٣,٠ كجم في ٧ مجموعات متساوية (٦ أنثى، ٢ نكور) وزعت عشوائيا علي العلائق السبعة التالية: العليقة الأولى تحتوي علي ٤٠% دريس البرسيم (المجموعة المقارنة) في حين تم استبدال ٥٠، ٧٥، ١٠٠ من دريس البرسيم الحجازي في العليقة المقارنة بدريس أوسيلاج عروش الفول السوداني علي التوالي في العلائق الثانية، الثالثة، والرابعة، والخامسة، والسادسة، والسابعة علي التوالي. تم حساب معدل الأخصاب، عدد النجاس عند الولادة وكذلك الوزن بعد ١٤، ٢١، ٢٨، ٣٥ يوم من الولادة. كما تم تجميع السائل المنوي ٣ مرات خلال الشهر الأخير من التجربة باستخدام المهبل الصناعي. وتم تقدير كسلا من حجم القذف، ودرجة الحموضة، والحيوية، والتركيز وكذلك عدد الأسبيمات الشاذة والميتة. وكانت أهم النتائج كالآتي:-

- ١- تراوحت قيم معدل الإخصاب من ٨٣,٣٣% إلى ١٠٠,٠٠% لإنات الأرانب النيوزيلندي في الولادة الأولى وكان متوسط الزيادة اليومية في وزن الأرانب المولودة عند الفطام (عمر ٣٥ يوما) يتراوح من ٢٥,١٤ إلى ٣٢,١٤ جرام/اليوم ومعدل النفوق خلال الفترة من الميلاد حتى الفطام تراوح من ٩,٥٣ إلى ٢٤,٧٧%.
- ٢- انخفض الأداء التناسلي في الولادة الثانية مقارنة بالولادة الأولى. وأظهرت النتائج أن الاختلافات في خصائص الأم وخلفتها كانت غير معنوية مانعا الوزن عند الميلاد، والزيادة اليومية في وزن الخلفة عند ٢١، ٢٨ يوما فكانت معنوية (عند مستوى ٠,٠٥) بين المعاملات الغذائية - نسبة النفوق كانت أعلى مقارنة بالولادة الأولى.
- ٣- أظهرت النتائج عدم وجود فروق معنوية بين حجم القذف والحيوية والـ pH وتركيز السائل المنوي لذكور الأرانب النيوزيلندي المغذاة علي علائق تحتوي علي مستويات مختلفة من عروش الفول السوداني في صورة دريس أو سيلاج.
- ٤- أظهرت النتائج الاقتصادية للأداء التناسلي للأرانب في المعاملة السابعة أفضل للقيمة للكفاءة الاقتصادية والنسبية للكنترول مع وجود فروق معنوية (عند مستوى ٠,٠٥) بين المعاملات الغذائية المختلفة.

بناء على النتائج السابقة يتضح أن عروش الفول السوداني في صورة دريس أو سيلاج من مواد العلف المألوفة العالية الأستاعة والتي يمكن استخدامها بنجاح في تغذية الأرانب دون حدوث مشاكل تناسلية. أيضا استخدام عروش الفول السوداني (دريس أو سيلاج) أدى إلى تحسين الإدء الإنتاجي للأرانب النيوزيلندي النامية وكذلك انخفاض تكاليف الغداء نتيجة لانخفاض أسعارها كما ان استخدام دريس عروش الفول السوداني مناسب لعمل العلائق التجارية والتي غالبا ما تكون في صورة مكعبات.