

## **BIBLIOGRAPHY**

MALANES, NORWIN B. JANUARY 2012. Growth Performance of Rabbits Fed with Different Kinds of Garden Weeds. Benguet State University, La Trinidad, Benguet.

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## **ABSTRACT**

The study was conducted to compare the growth performance of rabbits fed with different kinds of garden weeds. Specifically, the study aimed to determine the growth performance of rabbits fed with different kinds of garden weeds in terms of total gain in weight, feed consumption, feed conversion ratio, and morbidity and mortality rates.

Statistical analysis showed no significant differences in terms initial and final weights, total gains in weight and feed conversion ratio. Significant differences were only observed in feed consumption.

The rabbits had an overall mean initial weight of 0.53 kg and 1.69 kg for final weight. The overall total gains in weight was 1.155 kg and an overall mean FCR of 8.678.

For the feed consumption, the rabbits fed with Black Nightshade had the highest feed consumption followed by rabbits fed with Hairy Bitter Cress and finally those fed with Wild Radish and those fed with the combination of the three garden weeds.

Based on the results of the study, it can be said that the garden weeds namely Black Nightshade, Hairy Bitter Cress and the Wild Radish can be used as feeds for rabbits and they can be fed solely or combined together.



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## INTRODUCTION

Rabbits have potential as meat-producing animals in the tropics, particularly on subsistence-type small farms. Such characteristics as small body size (thus low daily feed requirements), short generation interval, high reproductive potential, rapid growth rate and the ability to utilize forages and fibrous agricultural by-products are attributes in favor of rabbit production (Cheeke, 1978). They can even be raised with simple housing and management and they can be raised by farmers or anybody at that as one of their hobbies.

The rabbit is a small herbivore that has a digestive tract uniquely suited to the utilization of herbage. It can be fed with different kinds of garden weeds to be specific. It is in this connection that this study was conducted to determine the growth performance of rabbits fed with different garden weeds most especially so that garden weeds are copious at any garden in this locality.

This study is about the growth performance of rabbits fed with different kinds of weeds. The result of the study can contribute knowledge in the field of animal feeds and feeding as well as animal nutrition. It can served as example for rabbit raisers for them to realize that the weeds that they usually removed from their gardens can be used as feeds to rabbits and since these weeds are taken free, their usage can result to a reduction in feed cost. The result also serves as a reference material to other researchers to come up with follow-up studies

Generally, this study was conducted to determine the performance of rabbits fed with different garden weeds namely Black nightshade, Hairy bitter cress, and Wild radish.



Specifically, it aimed to determine the performance of rabbits fed with different garden weeds in terms of gain in weight, feed consumption, feed conversion ratio, and feed cost to produce a unit gain in weight, and morbidity and mortality rates and to determine the garden weeds that give the best.

The study was conducted at the BSU Rabbitry House, Balili, La Trinidad, Benguet from November, 2011 to February, 2012 for a period of 95 days.



## REVIEW OF LITERATURE

Cheeke (1986) that rabbits have potential as meat-producing animals in the tropics, particularly on subsistence-type small farms. Such characteristics as small body size (thus low daily feed requirements), short generation interval, high reproductive potential, rapid growth rate and the ability to utilize forages and fibrous agricultural by-products are attributes in favor of rabbit production.

The conventional feeds in rabbit production in our locality are concentrates of rabbit pellets and forage. Commercial feed usually accounts for about 70% of total cost of rabbit production. A problem also with local production of concentrates is the absence of facilities to make “pellets” and rabbit do not want to feed in the form of powder. The fine particles cause respiratory and digestive problems. One advantage of rabbit is that it is herbivorous non-ruminant. Compared to the other monogastric animals, it can digest the protein in forage very efficiently. Rabbits are herbivores but it is a common practice to give them concentrates before they are provided with their regular roughage diet (Bennet, 1979).

Studies have shown that there are potentially many sources of fodders in the form of tree leaves which are not as yet, being utilized to the maximum extent (D’Mello, 1991; Kier et al., 1997). Similarly, Kamalaket. al (2004)cited that tree and shrub leaves have the potential for alleviating some of the feed shortages and nutritional deficiencies experienced in the dry season on smallholder. Moreover, Cawad (2004), stated that rabbits love to eat variety of foliage from trees, shrubs, weeds, and grasses.



Maddul (1999) cited that the digestive system of rabbits allows the utilization of forage based diets effectively despite its being a non-ruminant. Consequently, rabbits are well suited to low-energy, fibrous feedstuffs and are less-adapted to high-energy ingredients such as cereals grains. Thus fibrous feedstuffs such as fodder or fresh forage are typically the basal ingredients of rabbit's diets. For small-scale rabbits raising, feeding grains such as grass, vegetable, carrots and others succulent feeds maybe feasible, but is not practical on a commercial scale.

Escborn (1985) cited that rabbits are unique among small animals for food and commerce because they produce highly nutritious, low fat, low cholesterol meat rich in proteins and certain vitamins and minerals. Being herbivores, they do not compete with humans for their food and are easily adoptable to different environments. Investment and labors are low and rabbits can be cared for by the most vulnerable family members. They are easy to transport and are highly productive, with short gestation and lactating periods.



## MATERIALS AND METHODS

### Materials

The materials used in the study were as follows: weighing scale, feeding racks and watering crocks, record book, cleaning materials, twelve (12) New Zealand White Rabbits that were 2 months old and selected weeds namely the Black Nightshade (*SolanumNigrum*), Hairy Bitter Cress (*CardamineHirsuta*), and Wild Radish (*RorripaIndica*) as shown in Figures 1-3.

### Methodology

Preparation of rabbit cages. Two weeks before the start of study, the rabbit cages including the feeding racks and watering crocks were cleaned and disinfected.

Procurement of stocks. The stocks were purchased from one of the rabbit raisers within Baguio-La Trinidad.

Experimental treatments and design. Following the Completely Randomized Design (CRD), the 12 rabbits were equally divided into 4 to compose the 4 treatments (Fig. 4). Each treatment had 3 replications with one rabbit per replication.

However, before the rabbits were assigned to their corresponding cages, their weights were obtained and recorded to serve as their initial weights. The different treatments were as follows:

T <sub>1</sub>	Black Nightshade
T <sub>2</sub>	Hairy Bitter Cress
T <sub>3</sub>	Wild Radish
T <sub>4</sub>	Combination of the three treatments





Fig 2. Black Nightshade



Fig 2. Hairy bitter cress







Fig 4. Wild Radish



Fig. 4. New Zealand White Rabbits assigned in one of the treatment



Care and management of rabbits.The rabbits in all the treatments were subjected to the same care and management. The only difference was on the types of weeds fed to the rabbits depending on what treatments where they belong. The rabbits that were assigned in treatment 1 were fed with Black Nightshade, Hairy Bitter Cress for those assigned in treatment 2, Wild Radish for treatment 3 and combination of the above garden weeds for treatment 4.

Feeding was done twice a day, once in the morning at 6:00 o'clock and another in the afternoon at 4:00 o'clock. Water was always available. However, before the feedstuffs were given to the rabbits, these were washed after which these drained so that as much as possible, these were given dry. Also, the weight of the feeds given to the rabbits in a day was obtained and recorded. Cleaning of the rabbit cages most especially underneath was done every morning before feeding time.

#### Data Gathered

1. Initial weight (kg). This was obtained by weighing the experimental rabbits individually at the start of the study.
2. Final weight (kg). This was obtained by weighing the experimental rabbits individually at the end of the study.
3. Feed offered (kg). This was obtained by taking the weight of the feeds given to the experimental rabbits each day.
4. Feed leftover. This was the amount of feeds not consumed by the rabbits which was taken every morning before feeding them.
5. Morbidity. This refers to the number of rabbits that got sick during the duration of the study.



6. Mortality. This refers to the number of rabbits that died during the duration of study.

7. Production cost. This refers to the cost each of the materials used in the.

From the data above, the following were computed.

1. Feed intake (kg). This was obtained by subtracting the total amount of leftover feeds from the feeds offered.

2. Total gain in weight (kg). This was computed by subtracting the initial weight from the final weight of the rabbit per replicate.

3. Morbidity rate (%). This was computed by dividing the number of rabbits that got sick by the total number of rabbits per replicate multiplied by 100%.

4. Mortality rate (%). This was computed by dividing the number of rabbits that died during study period by the total number of rabbits per replicate multiplied by 100%.

5. Feed conversion ratio (FCR). This was taken by using this following formula:

$$\text{FCR} = \frac{\text{Total Feed Intake}}{\text{Total Gain in Weight}}$$

6. Net profit (Php). This was taken by subtracting the total cost of production from the gross sales of rabbits.

7. Return of Investment (ROI). This was taken using the following formula:

$$\text{ROI} = \frac{\text{Net Profit}}{\text{Total Cost Production}} \times 100\%$$

### Data Analysis

The data gathered were analyzed using the Analysis Of Variance (ANOVA) for Completely Randomized Design (CRD). Treatment means were compared using the Duncan Multiple Range Test (DMRT).



## RESULTS AND DISCUSSION

### Body Weights

Table 1 shows the initial and the final weights of the rabbits in the different treatments. In terms of initial weight, statistical analysis revealed that there were no significant differences between treatment means. This indicates that the rabbits used in the study were more or less of the same weight at start of the study. The overall mean initial weight of the rabbits was 0.53 kg.

Similarly, no significant differences were also observed between treatment means in the final weights of the rabbits. This indicates also that the rabbits in all the treatments were more or less of the same weight at the end of the study. The overall mean final weight of the rabbits was 1.69kg.

Table 1. Mean initial (at 60 days old) and final weight (at 115 days) of the rabbits by treatment (kg)

TREATMENT	MEAN*	
	Initial	Final
Black Nightshade	0.446	1.66
Hairy Bitter Cress	0.524	1.66
Wild Radish	0.632	1.67
Combination of the three treatments	0.513	1.76

\*Means with no letter superscripts are not significantly different at 5% level of significance (DMRT)



Table 2. Total gains in weight of the rabbits from 60 days to 155 days old by treatment (kg)

TREATMENT	MEAN*
Black Nightshade	1.194
Hairy Bitter Cress	1.139
Wild Radish	1.043
Combination of the three treatments	1.243

\*Means with no letter superscripts are not significantly different at 5% level of significance (DMRT)

#### Total Gain in Weight

Table 2 shows the total gains in weight of the experimental rabbits for a feeding period of 95 days. Like in body weight, statistical analysis revealed that there were no significant differences among treatment means. This means that the gains in weight of the experimental rabbits were more or less the same. It also means that any of the garden weeds namely black nightshade, hairy bitter cress and wild radish or garden weeds be used as feeds of the rabbits, and it can be fed sole or combined together. The total gains in weight of the rabbits range from 1.243 kg observed from the rabbits fed with combination of the three garden weeds to 1.043kg observed from the rabbits fed with wild radish. The overall total gain in weight of the rabbits was 1.155 kg.

#### Feed Consumption

Table 3 presents the feed consumption of the rabbits in the different treatments. It is shown in the Table that the rabbits fed with the Black Nightshade had the highest feed consumption with a mean of 10.211 kg as revealed by the statistical analysis. This was followed by the feed consumption of the rabbits fed with Hairy Bitter Cress with a mean



Table 3. Feed consumptions of the rabbits from 60 days to 155 days old by treatment (kg)

TREATMENTS	MEAN*
Black Nightshade	10.210 <sup>a</sup>
Hairy Bitter Cress	9.930 <sup>b</sup>
Wild Radish	9.650 <sup>c</sup>
Combination of the three treatments	9.560 <sup>c</sup>

\*Means with no letter superscripts are not significantly different at 5% level of significance (DMRT)

of 9.93 kg, and finally the feed consumptions of the rabbits fed with the wild radish and those fed with the combination of the above garden weeds with means of 9.650 kg and 9.560 kg, respectively.

The above result reveals that the feedstuff Black Nightshade seems to be more palatable than the other feedstuffs in the study, hence, the higher feed consumption observed from the rabbits fed with it.

#### Feed Conversion Ratio (FCR)

Table 4 shows that the FCR of the rabbits fed with the different garden weeds namely black nightshade, hairy bitter cress, wild radish and the combination of the three. Statistical analysis showed that there were no significant differences between treatment means. It means that the FCR of the rabbits were more or less the same. The FCR of the rabbits ranging from 7.763 derived from the rabbits fed with combination of the three garden weeds to 9.507 derived from the rabbits fed with wild radish. The overall mean FCR was 8.678.



Table 4. Feed conversion ratio observed from the rabbits by treatment

TREATMENT	MEAN*
Black Nightshade	8.627
Hairy Bitter Cress	8.817
Wild Radish	9.507
Combination of the three treatments	7.763

\*Means with no letter superscripts are not significantly different at 5% level of significance (DMRT)

#### Morbidity and mortality.

No one among the rabbits got sick during the entire duration of the study. However, one of the rabbits from those fed with Black Nightshade during the earlier part of the study died but it was not because of the feedstuff fed. Instead it was due to the faulty in the cage where it was confined.



## **SUMMARY, CONCLUSION, AND RECOMMENDATION**

### Summary

The study was conducted to compare the growth performance of rabbits fed with different kinds of garden weeds that were 2 months old. The rabbits involved in the study were 12 New Zealand White Rabbits. This was conducted at the Benguet State University (BSU) Experimental Rabbitry House, Balili, La Trinidad, Benguet from November 10 to February 2012.

Specifically, the study aimed to determine the comparative growth performance of rabbits fed with different kinds of garden weeds in term of total gain in weight, feed conversion ratio, and morbidity and mortality rates and to determine which garden weed that produce the best performance in rabbits. Following the completely randomized design, the rabbits were randomly distributed in four treatments. Each treatment was replicated three times with one rabbit per replication. The different treatments were as follows: T<sub>1</sub>-black nightshade; T<sub>2</sub>-hairy bitter cress; T<sub>3</sub>-wild radish; T<sub>4</sub>-combination of the three feedstuffs.

Results of the study showed that the there were no significant differences between treatment means as revealed by the statistical analysis in terms of body weights, gains in weight, feed conversion ratio. The overall mean initial weight of the rabbits was 0.53 kg and 1.69 kg for the overall final weight. The mean total gain in weight ranged from 1.243 kg derived from the rabbits fed with the combination of the different garden weeds to 1.043 kg derived from the rabbits fed with Wild radish. Lastly, for the feed conversion ratio, the ranged was from 7.763, again derived from the rabbits fed with the combination of the three garden weeds to 9.507, derived from the rabbits fed with Wild radish.





A significant effect was observed only in the feed consumption. The rabbits fed with Black Nightshade had the highest feed consumption followed by those fed with Hairy Bitter Cress. The rabbits fed with Wild Radish and those fed with the combination of the three garden weeds had the lowest feed consumption.

### Conclusion

Based on the result of the study, it is therefore concluded that the rabbits when fed with garden weeds namely Black Nightshade, Hairy Bitter Cress, Wild Radish or combination of the above weeds will have more or less the same growth performance.

### Recommendation

Based on the results of the study, it is therefore recommended that the garden weeds namely the Black Nightshade, Hairy Bitter Cress and Wild Radish can be used as feeds to rabbits and these can be fed solely or combined together.

However further study should be conducted to include the effect of the above garden weeds on the quality of the rabbits.



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## APPENDICES

Appendix Table 1. Mean initial weight of rabbits at 60 days old (kg)

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
T <sub>1</sub>	0.450	0.500	0.449	1.399	0.466
T <sub>2</sub>	0.500	0.542	0.530	1.572	0.524
T <sub>3</sub>	0.650	0.700	0.542	1.892	0.513
T <sub>4</sub>	0.449	0.641	0.450	1.540	0.513
GRAND TOTAL				6.40	
GRAND MEAN					0.53

### ANALYSIS OF VARIANCE

SV	DF	SS	MS	Computed F	5%	Tabular F	1%
Treatment	3	0.0433	0.01445	2.8807	4.0662	7.5910	
Error	8	0.0401	0.00502				
Total	11	0.0835					

CV= 13.27%



Appendix Table 2. Mean final weight of rabbits at 155 days of age (kg)

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
T <sub>1</sub>	1.71	1.77	1.49	4.97	1.66
T <sub>2</sub>	1.75	1.74	1.50	4.99	1.66
T <sub>3</sub>	1.75	1.52	1.75	5.02	1.67
T <sub>4</sub>	1.76	1.72	1.79	5.27	1.76
GRAND TOTAL				20.25	
GRAND MEAN					1.69

## ANALYSIS OF VARIANCE

SV	DF	SS	MS	Computed F	5%	Tabular F	1%
Treatment	3	0.0196	0.00652	0.4301	4.0662	7.9510	
Error	8	0.1213	0.01516				
Total	11	0.1408					

CV= 7.30%

Appendix Table 3. Mean feed consumption of the rabbits from 60-155 days old (kg)

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	II		
T <sub>1</sub>	10.270	10.170	10.190	30.630	10.210 <sup>a</sup>
T <sub>2</sub>	10.000	9.870	9.920	28.950	9.650 <sup>b</sup>
T <sub>3</sub>	9.710	9.620	9.620	28.950	9.560 <sup>c</sup>
T <sub>4</sub>	9.610	9.580	9.490	28.680	9.560 <sup>c</sup>
GRAND TOTAL				118.05	
GRAND MAEN					9.84

## ANALYSIS OF VARIANCE

SV	DF	SS	MS	Computed F	5%	Tabular F	1%
Treatment	3	0.7784	0.25947	75.7591**	4.0662	7.5910	
Error	8	0.0274	0.00343				
Total	11						

CV= 0.59%



Appendix Table 4. Total gains in weight of the rabbits from 60-155 days old (kg)

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
T <sub>1</sub>	1.270	1.270	1.041	3.581	1.194
T <sub>2</sub>	1.250	1.198	0.970	3.418	1.139
T <sub>3</sub>	1.100	0.820	1.208	3.128	1.043
T <sub>4</sub>	1.330	1.079	1.340	3.730	1.243
GRAND TOTAL				13.857	
GRAND MEAN					1.155

## ANALYSIS OF VARIANCE

SV	DF	SS	MS	Computed F	5%	1%
					Tabular F	Tabular F
Treatment	3	0.0665	0.02216	0.8845	4.0662	7.5910
Error	8	0.2005	0.02506			
Total	11	0.2669				

CV= 13.71%



Appendix Table 5. Feed conversion ratio of the rabbits by treatment

TREATMENT	REPLCATION			TOTAL	MEAN
	I	II	II		
T <sub>1</sub>	8.080	8.010	9.790	25.880	8.627
T <sub>2</sub>	8.000	8.230	10.220	26.450	8.817
T <sub>3</sub>	8.830	11.730	7.960	28.520	9.507
T <sub>4</sub>	7.330	8.880	7.080	23.290	7.763
GRAND TOTAL				104.14	
GRAND MEAN					8.678

## ANALYSIS OF VARIANCE

SV	DF	SS	MF	Computed F	Tabular F
				5%	1%
Treatment	3	9.0069	3.00229	1.7668	4.0662
Error	8	13.5940	1.69925		7.5910
Total	11	22.5940			

CV= 15.62%

