



## Evaluation of Growth Performance of Weaned Rabbits under different Feeding System for Meat Production

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**ABSTRACT:** An experiment was conducted to study the growth performance of New Zealand White rabbits in different feeding system. The rabbits feeding habit caecotrophy makes to utilize high forage diet effectively upto (20%) fiber. Commercial rabbitry are scanty to feed tree leaves and improve the body weight gain. Hence the present study was carried out at Rabbit Breeding Unit, Post Graduate Research Institute in Animal Sciences, Kattupakkam to feed rabbits at different fodders. Thirty two weaned New Zealand White rabbits aged between six to seven weeks were randomly selected and divided into four groups each group (n=8). Group T1 (15parts Desmanthus + 85 parts Concentrate ), T2 (20 parts Subabul + 80 parts Concentrate), T3 (25 parts Hydroponic Maize +75 parts Concentrate) and T4 (30 parts Guinea grass + 70 parts Concentrate). The trial was conducted for 24 weeks period. The growth performance of rabbits fed on leguminous green fodder Desmanthus was found to be better than all other treatment groups. The overall weight gain was significantly higher ( $P \leq 0.01$ ) in Desmanthus fed rabbits followed by subabul, hydroponic maize and guinea grass respectively. The average daily gain of rabbits highly significant ( $P \leq 0.01$ ) gain in T1 groups. It is concluded the leguminous fodder *Desmanthus virgatus* can be included in 15% level rabbits had better weight gain in broiler rabbit production.

**Keywords:** Rabbits, Desmanthus, Subabul, hydroponic maize, Guinea grass, Growth Performance.

### INTRODUCTION

Rabbits are efficient converter of forage into good quality animal protein. The broiler rabbit farming is gaining momentum and becoming popular as a meat animal. Rabbits have short generation interval, high prolificacy, ability to utilize waste and other unconventional feed sources and ability to thrive well on forages. Rabbit meat is high in protein (22%) low in fat (4%) and cholesterol (5%) and thus possesses health promoting properties (Aduku and Olukosi 2000). The leguminous fodder *Desmodium tortuosum* (Beggar weed) could be used as dried green forages to improve lactation performance in local rabbits and to improve growth performance and nutritional meat quality of growing rabbits studied by Kone *et al.* (2022). Kouakou *et al.* (2015) observed the leaves and stem of cultivated *Ipomea batatas* (sweet potatoes) plants are possible constituents of the rabbit diet. The weaner rabbits fed dried *Moringa oleifera* leaf meal can be used up to 60% on diets improve growth performance and increased income from diets of weaner rabbits by Zandrato *et al.* (2019).

In India, the landless rabbit farmers depends on vegetable waste and tree fodders for rearing rabbits as backyard system to meet their family protein demand. Broiler rabbit production with appropriate technologies

can play an important role in scaling up the production traits and thereby economic benefits to the farmers. The rabbit has the potential of becoming an important source of animal protein with its ability to utilize efficiently forage, a cheaper feedstuff (Anugwa *et al.*, 1982). Commercial rabbit farms are scanty and feeding their rabbit with leguminous fodder like Desmanthus to obtain market weight in 12 weeks upto 2 kg. Hence, the cost of feed reducing will improve the farm profit. The different tree leaves and green fodders are being fed separately are not available for rabbits. Hence, the present study was carried out to assess the growth performance of rabbits on different feeding system with tree leaves and green fodders.

### MATERIALS AND METHODS

An experiment was conducted in New Zealand White rabbits to study the growth performance on feeding tree leaves and forages along with concentrate. This research trial was conducted at Rabbit Breeding Unit, Post Graduate Research Institute in Animal Sciences, Tamil Nadu Veterinary and Animal Sciences University, Kattupakkam. The rabbits were maintained in cage system of rearing and housed in individual Galvanized iron cages with the dimension of 2 feet × 1.5 feet × 1.5 feet kept above 3 feet from the ground level. The weaning was done on 42 days.

Thirty two weaned New Zealand White rabbits of bunnies aged between six to seven weeks were randomly selected and divided into four groups. The experimental animals fed group T<sub>1</sub> (15parts Desmanthus +85 parts Concentrate), T<sub>2</sub> (20 parts Subabul + 80 parts Concentrate), T<sub>3</sub> (25parts Hydroponic maize +75 parts Concentrate) and T<sub>4</sub> (30 parts Guinea grass + 70 parts Concentrate). The trial was conducted for a period of 24 weeks. All the trial animals were reared under similar intensive system of management. Based on the results of proximate analysis of feed and fodders and palatability study of desmanthus, subabul, hydroponic maize and guinea grass, the experimental ration of isocaloric and iso nitrogenous in nature was formulated. Clean portable water was supplied for drinking all the time. Daily feed offered and residue available on next day was recorded and calculated the daily feed intake. Biweekly the rabbits were weighed to assess the growth performance and average daily gain. The feed conversion efficiency was calculated based on the data available on dry

matter intake and weigh gain. During the study fortnightly body weight, body weight gain and average daily weight gain were recorded to assess the growth performance of rabbits.

**Statistical analysis.** The data collected on various parameters were statistically analyzed as per the method of Snedecor and Cochran (1989).

## RESULTS AND DISCUSSION

The proximate principles of the Desmanthus, subabul, hydroponic maize and guinea grass showed the crude protein content was higher in leguminous forages desmanthus (20.3%) and tree leaves subabul (21.41%). Similar findings was reported by Pasupathi *et al.* (2015) in tree leaves and leguminous fodder. Anandan (2022) observed the crude protein content was higher in land grown guinea grass (14.76%) compare to hydroponic maize (12.55%). This might be due to fertilization of land with poultry manure. The crude fibre was higher in guinea grass than other forages.

**Table 1: Proximate compositions (% on DM basis) of green forages.**

Sr. No.	Proximate Principles	<i>Desmanthus virgatus</i> (Hedge Lucerne)	<i>Leucaena leucocephala</i> (Subabul)	Hydroponic Maize ( <i>Zea mays</i> )	Guinea grass ( <i>Megathyrus maximus</i> )
1.	Crude Protein (%)	20.30	21.41	12.55	14.76
2.	Crude Fibre (%)	8.27	10.12	9.01	26.33
3.	Ether Extract (%)	7.62	7.46	4.34	3.52
4.	Total Ash (%)	8.25	8.53	2.91	11.88

**Table 2: Mean±S.E. Fortnight body weight(kg) of rabbits in different feeding system.**

Weeks	Hedge Lucerne ( <i>Desmanthus virgatus</i> ) (T <sub>1</sub> , n=8)	Subabul ( <i>Leucaena leucocephala</i> ) (T <sub>2</sub> , n=8)	Hydroponic Maize ( <i>Zea mays</i> ) (T <sub>3</sub> , n=8)	Guinea grass ( <i>Megathyrus maxi mus</i> ) (T <sub>4</sub> , n=8)
At start (6)	0.83±0.01	0.78±0.01	0.80±0.09	0.76±0.04
6-8	1.02 <sup>a</sup> ±0.12	0.90 <sup>a</sup> ±0.19	0.93 <sup>b</sup> ±0.07	0.9 <sup>a</sup> ±0.03
8-10	1.24 <sup>a</sup> ±0.15	1.17 <sup>b</sup> ±0.15	1.11 <sup>b</sup> ±0.09	1.01 <sup>b</sup> ±0.01
10-12	1.49 <sup>a</sup> ±0.06	1.39 <sup>a</sup> ±0.01	1.25 <sup>b</sup> ±0.12	1.12 <sup>c</sup> ±0.06
12-14	1.77 <sup>a</sup> ±0.10	1.59 <sup>b</sup> ±0.11	1.45 <sup>b</sup> ±0.14	1.28 <sup>c</sup> ±0.07
14-16	1.98 <sup>a</sup> ±0.16	1.76 <sup>b</sup> ±0.09	1.69 <sup>b</sup> ±0.17	1.38 <sup>c</sup> ±0.08
16-18	2.22 <sup>a</sup> ±0.11	1.90 <sup>b</sup> ±0.12	1.81 <sup>b</sup> ±0.10	1.50 <sup>c</sup> ±0.02
18-20	2.42 <sup>a</sup> ±0.15	2.11 <sup>b</sup> ±0.18	1.97 <sup>b</sup> ±0.11	1.68 <sup>c</sup> ±0.01
20-22	2.69 <sup>a</sup> ±0.09	2.33 <sup>b</sup> ±0.05	2.18 <sup>b</sup> ±0.16	1.85 <sup>d</sup> ±0.06
22-24	2.98 <sup>a</sup> ±0.13	2.51 <sup>b</sup> ±0.01	2.36 <sup>b</sup> ±0.12	1.97 <sup>c</sup> ±0.05

Means with different superscript in the same row are significantly different from each other

The present study the rabbits fed with desmanthus had higher body weight at the age of 24 weeks than fed with tree leaves and hydroponic maize fodder. This is due to the fact that *Desmanthus virgatus* was effectively fermented in the enlarged appendix and thus release nutrients from crude fibre. The rabbits fed Desmanthus showed better weight gain and lower cost per kilogram weight gain than rabbits fed with *Stylosanthus scabra* and *Crotalaria juncea* by Gunasekaran *et al.* (2013). Jagatheesan *et al.* (2006) reported feeding of concentrate with ad-libitum green Desmanthus had in better growth particularly when pellet form of concentrate feed was fed while rabbits in cold season had higher growth rate when compared to those in hot

season. In contrast, Pasupathi *et al.* (2015), the rabbits complete extruded feed prepared with *Erithrina indica* showed higher body weight at 10 weeks of age than desmanthus. The rabbits fed with tree leaves subabul and hydroponic maize fodder had no significant difference (P<0.01) in body weight. The subabul included in the present study is lower than the level recommended (24 to 40 %) by Adejumo (2006). Earlier workers have also showed an increase in body weight by feeding different sprouted grain for rabbits by Carmona *et al.* (2011); Jemimah *et al.* (2018). The poor performance and lower body weight was observed in rabbits fed with guinea grass by Anandan (2022).

**Table 3: Mean±S.E. Fortnightly weight gain (g) of rabbits in different feeding system.**

Weeks	Hedge Lucerne ( <i>Desmanthus virgatus</i> ) (T1,n=8)	Subabul ( <i>Leucaena leucocephala</i> ) (T2,n=8)	Hydroponic Maize ( <i>Zea mays</i> ) (T3,n=8)	Guinea grass ( <i>Megathyrus maximus</i> ) (T4, n=8)
6-8	190.20±5.21	120.60±23.39	130.70±15.15	140.00±15.15
8-10	220.20±28.45	270.60±24.91	180.30±21.03	110.30±21.03
10-12	250.00±30.31	220.10±31.86	140.80±28.12	110.80±28.12
12-14	280.70±15.55	200.80±13.42	200.60±11.48	160.60±11.48
14-16	210.30±10.50	170.70±14.90	240.60±17.51	100.60±17.51
16-18	240.20±11.07	140.60±15.56	120.60±18.72	120.60±18.72
18-20	200.70±14.12	120.90±26.57	160.00±17.22	180.00±17.22
20-22	270.00±18.84	220.40±17.97	210.00±13.69	170.00±13.69
22-24	290.80±14.59	180.10±27.16	180.00±20.60	120.00±20.60
Overall 6-24	2153.1.10±54.84	1644.80±13.82	1563.60±62.95	1212.90±62.95

Means with different superscript in the same row are significantly different from each other

The fortnight body weight gain and average daily gain at 24 weeks of age was higher in rabbits fed with desmanthus than other treatment groups. the lower body weight gain was observed in rabbits fed with guinea grass. Similar findings was observed Anandan (2022) in Soviet Chinchilla rabbits. Pasupathi *et al.* (2015) recommended 15% desmanthus and 50% subabul can be included with complete extruded feed of growing

rabbits. The hydroponic maize fodder (25%) included in the present study was lower. Jemimah *et al.* (2018) studied hydroponic maize fodder with replacement of concentrate mixture in New Zealand white rabbits and suggested that, the hydroponic yellow maize fodder can be included in the diet of rabbit up to 50% level without any adverse effect on their growth and profitability.

**Table 4: Mean±S.E. Average daily gain of rabbits fed in different treatment groups.**

Age (Weeks)	Average daily gain (g/day)			
	Hedge Lucerne ( <i>Desmanthus virgatus</i> ) (T1, n=8)	Subabul ( <i>Leucaena leucocephala</i> ) (T2, n=8)	Hydroponic Maize ( <i>Zea mays</i> ) (T3, n=8)	Guinea grass ( <i>Megathyrus maximus</i> ) (T4, n=8)
6-8	12.68±0.37	8.04±1.64	8.71±1.08	9.33±1.04
8-10	14.68±2.03	18.04±1.78	12.08±1.58	12.02±1.52
10-12	16.67±2.17	14.67±2.22	9.39±2.23	9.39±2.11
12-14	18.71±1.11	13.38±0.63	13.37±0.82	13.39±0.82
14-16	14.02±0.43	11.38±1.06	16.04±1.25	16.04±1.45
16-18	16.01±0.79	9.37±1.11	8.04±1.34	8.04±1.34
18-20	13.33±1.21	8.06±1.90	10.67±1.23	10.67±1.13
20-22	18.00±1.31	14.70±1.11	14.04±0.54	14.04±0.98
22-24	19.38±1.04	12.10±1.91	12.70±1.42	12.01±1.27
Overall 6-24	15.94±0.44	12.18±0.62	11.58±0.40	8.98±0.59

Means with different superscript in the same row are significantly different from each other

**Table 5: Mean±S.E. feed conversion ratio of rabbits fed with different feeding system.**

Age (Weeks)	Hedge Lucerne ( <i>Desmanthus virgatus</i> ) (T1, n=6)	Subabul ( <i>Leucaena leucocephala</i> ) (T2, n=6)	Hydroponic Maize ( <i>Zea mays</i> ) (T3, n=6)	Guinea grass ( <i>Megathyrus maximus</i> ) (T4, n=6)
6-8	2.71±0.09	3.33±0.08	3.27±0.33	3.14±0.06
8-10	3.52±0.01	4.27±0.06	3.47±0.40	3.83±0.35
10-12	5.11±0.09	5.10±0.07	4.93±0.66	9.91±1.63
12-14	6.25±0.01	6.55±1.01	5.49±0.38	8.41±0.65
14-16	7.35±0.57	7.10±0.56	7.70±0.81	24.21±6.26
16-18	8.32±0.09	8.01±0.09	15.47±2.46	26.46±4.32
18-20	9.21±0.02	8.99±0.02	10.87±6.53	30.56±10.20
20-22	9.11±0.09	9.10±0.09	11.69±1.28	33.16±12.99
22-24	10.25±0.09	10.58±0.06	12.98±2.22	36.42±9.18
Overall 6-24	6.87±0.55	7.02±0.04	8.43±0.30	9.64±0.49

Means with different superscript in the same row are significantly different from each other

The present study feed conversion ratio for rabbits fed with Desmanthus, subabul, hydroponic maize and Guinea grass were 6.87, 7.02, 8.43 and 9.64 respectively. The feed conversion ratio of rabbit on total dry matter intake was higher in rabbits fed with desmanthus. Similar findings observed among the forages, rabbits fed *Desmanthus virgatus* showed better

weight gain, feed conversion ratio, digestibility of nutrients by Gunasekaran *et al.* (2013). Jemimah *et al.* (2018) observed 50 % replacement of concentrate mixture with hydroponic yellow maize fodder not only influences the growth of rabbit but significantly (p< 0.01) reduced the feed conversion ratio (3.61 + 0.15) and cost of feeding/animal/30 days. In contrast, Shah *et*

al. (2023) concluded that growth performance of hydroponically grown forage on combination of pea and wheat feeding diet found better than without hydroponics forage feeding in intensive housing system.

## CONCLUSIONS

The result of the study, rabbits fed with desmanthus better weight gain followed by subabul and hydroponic maize. The leguminous fodder desmanthus can be included in 15% level and tree leaves subabul and hydroponic maize upto 50% level in ration for better performance of broiler rabbit production. It was also observed that rabbits perform better when fed the tree leaves and hydroponic fodder compared to tropical grass supplemented with concentrate.

## FUTURE SCOPE

This study will help to understand in commercial rabbit production for economic feeding of rabbits by replacement of leguminous fodder and tree leaves

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**Conflict of Interest.** None.

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