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Nutritive Value of Dolichos Lablab (*Lablab purpureus CV. Rongai*) Forage cut at Different Stages of Growth on Performance of Weaned Rabbits.

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Target Audience: Rabbit farmers, Nutritionist, pasture agronomist

Abstract

The study examined the effect of cutting lablab forage at different stages of growth (6, 12, 18 and 24 weeks) on the proximate composition, growth performance, nutrient digestibility and carcass characteristics of weaned rabbits. Lablab forage cut at different stages of growth were analyzed for dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE), ash and nitrogen free extract (NFE). Thirty (30) weaned rabbits with an initial weight of 541.67g were randomly allotted to five dietary treatments of six (6) rabbits per treatment in a completely randomized design. Diet I was the control (without lablab forage). Diet 2, 3, 4, and 5 contained lablab forage cut at 6, 12, 18 and 24 weeks, post germination, respectively. The diets were formulated to be iso-nitrogenous (18% CP). Measurements taken included live weight, feed intake, hematological parameters, carcass and organ characteristics. Weight gain, feed coversion ratio, cost per gain and nutrient digesbility coefficient were calculated. There were significant (P<0.05) differences in all the proximate parameters measured. The dry matter and crude fibre values showed steady increase as the forage plant advanced in age while the crude protein values decreased significantly (P<0.05) as the plant aged. Rabbits fed lablab forage cut at 12 weeks of age post germination performed significantly (P<0.05) better than those on other dietary treatments. Except for nitrogen free extract, apparent nutrient digestibilities were significantly (P<0.05) different across the dietary treatments. The haematological indices measured were within the normal range established for healthy rabbits. There were significant (P<0.05) differences in all the carcass parameter measured except for intestinal length, weight of the stomach and head. It was concluded that lablab purpureus forage should be harvested at 12 weeks of age post germination for optimum performance and nutrient utilization in weaned rabbits.

Keywords: Lablab, forage, performance, growth, rabbits.

Description of Problem

The rapid increase in human population has resulted in inadequate supply of the conventional protein feedstuff like soybean, groundnut cake and fish meal in the livestock feed market (1). This is because they are competed for by humans and industrial users. The shortage of conventional livestock feedstuff has resulted in the search for alternative protein sources for livestock feeding (2). Olurede *et al*. (3) had earlier opined that the feed and nutritional crises besetting the livestock population in Nigeria strongly indicates the need to expand the raw material base for livestock feed formulation to accommodate unconventional feed resources. In recent years, research interest and efforts have been intensified at identifying new potentially useful leguminous forage plants that could be used as protein sources in diets of rabbits because of their ability to efficiently convert a wide variety of forage materials to meat than most monogastric animals. One of such forage resource that is receiving attention and could be used as an alternative source of protein in rabbit nutrition is lablab forage.

Lablab purpureus is a dual purpose legume crop that is rapidly gaining acceptance by agro-pastoral farmers and have been widely used for feeding ruminants in the tropics (4, 5). It has high forage yield potential compared to other commonly grown legume crops (6). It is drought tolerant and can grow successfully in dry areas with rainfall as low as 40 mm (7, 8). Unlike groundnut haulms that is popular in feeding ruminants in the northern part of Nigeria, lablab forages are either left in the open field to be wasted or used by some livestock farmers to feed their animals post harvest when the forage plant have aged and the nutrient content might have depreciated. The use of poor quality lablab haulms, as it is the common practice among livestock farmers, may not elicit the optimum performance of the animals. It is against this background that this study was designed to evaluate the effect of harvesting lablab forage at different stages of growth post germination on the proximate composition, growth performance, carcass characteristics, and nutrient digestibility of weaned rabbits.

Materials and Methods

Source and processing of lablab forage

The lablab forage used for the study was harvested at different stages (6, 12, 18, and 24 weeks) of growth at the Institute for Agricultural Research (IAR) Farm, Ahmadu Bello University, Zaria. The forage materials were sundried post harvest and milled before incorporation into the experimental diets.

Proximate analysis of lablab forage

The dry matter (DM) of the forage materials was determined based on weight loss after 24 hours in an oven at a temperature of 100^0C. Nitrogen (N) content was determined by the macro Kjeldahl method (9) and crude protein (CP) calculated as nitrogen content multiply by 6.25 (N x 6.25). The ash content was determined as the residue remaining after incinerating the sample at 600^0C for 3 hours in a muffle furnance. The AOAC (9) procedure were employed for ether extract (EE) and crude fibre (CF) determination. The metabilizable energy (ME) of the forage materials cut at different stages of growth were calculated from the proximate composition data using the formula described by (10) as detailed below:

Metabolizable Energy ME (Kcal/kg) = 37 x (% CP) + 81.8 x (% EE) +35 x (% NFE).

Where

ME=Metabolizable Energy
CP=Crude Protein
EE=Ether Extract
CF=Crude Fibre
NFE=Nitrogen Free Extract.

Source of experimental animals

The rabbits used for the study were of mixed breed and were obtained from the Department of Animal Science Teaching and Research Farm, Ahmadu Bello University, Zaria.

Experimental diets

Five Iso-nitrogenous (18 % CP) diets were formulated for the study (Table 1). Diet 1 was the control and was without lablab forage. Diets 2, 3, 4, and 5 had lablab forage cut at various stages of growth (6, 12, 18 and 24 weeks) included at 20% level, respectively. The proximate composition of the experimental diets is presented in Table 2.

Design and management of experimental animals

Thirty weaned rabbits of mixed breed with average initial weight of 541.67g were randomly allotted into five treatment groups of six rabbits per treatment. The rabbits were housed in a standard four tier hutch (120cm x 150cm). The hutches were housed in a well ventilated house and had trays underneath for faecal and urine collection. Feed and water were given to the rabbits *ad libitum* throughout the trial period which lasted for 56-days. Precautive measures were taken to prevent feed wastage. The rabbits were weighed individually at the beginning of the experiment and subsequently on a weekly basis with a top loading sensitive balance scale. Each morning, feed not consumed were weighed and the amount of feed consumed determined by subtracting the left over feed from the amount of feed given to each of the animals the previous day. Daily weight gain and feed intake were calculated and recorded at the end of each week. Feed conversion ratio and cost per gain were calculated.

Apparent nutrient digestibility study

The digestibility trial was conducted using 24 male rabbits with four rabbits per treatment. The animals were individually placed in metabolism cages and were fed the experimental diets meant for each treatment group for 7 days to establish their average daily feed intake. Thereafter, they were fed 90% of their *ad libitum* intake to reduce feed wastage. Water was given *ad libitum.* Faecal collection was for seven days, using aluminum tray placed under the cages. The collected faecal samples were dried using a Gallen Kamp^R oven at 60^0C for 12 hours and subsamples stored in the refrigerator for proximate analysis.

The apparent nutrient digestibility for each of the nutrient was calculated using the formula below:

Apparent nutrient digestibility =

$$\frac{\text{Amount of nutrient intake} - \text{Amount of nutrient in faeces}}{\text{Amount of nutrient intake}} X\ 100$$

Blood collection and analysis

At the 7th week of the feeding trial, blood samples (5ml each) were collected from three rabbits per treatment into sample bottles containing Ethylene Diamine Tetra – Acetate (EDTA) as anticoagulant. The blood samples were assayed for haemoglobin (Hb), total protein (Tp), packed cell volume (PCV) and white blood cell (WBC). Packed cell volume and haemoglobin concentration were determined at the clinical Pathology Laboratory, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria using wintrobes Microhaematocrit and Calorimetry Cyanomethaemoglobin method (10).

Table 1: Composition of Experimental Diets Containing Lablab Forage cut at Different Stages of Growth

	Lablab forage cut at different age (weeks)				
Feed Ingredient (%)	Control	6	12	18	24
Maize	55.14	38.57	38.57	38.57	38.57
Lablab Forage	-	20.00	20.00	20.00	20.00
Groundnut cake	15.89	12.43	12.43	12.43	12.43
Soyabeans meal	5.00	5.00	5.00	5.00	5.00
Wheat Offal	10.00	10.00	10.00	10.00	10.00
Maize Offal	10.00	10.00	10.00	10.00	10.00
Bone Meal	3.00	3.00	3.00	3.00	3.00
Common Salt	0.30	0.30	0.30	0.30	0.30
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.25	0.25	0.25	0.25	0.25
Vitamin Premix*	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis					
ME (kcal/kg)	2884	2645	2645	2645	2645
Crude Protein (%)	18.00	18.00	18.00	18.00	18.00
Crude fibre (%)	6.27	9.68	9.68	9.68	9.68
Lysine (%)	0.84	0.75	0.75	0.75	0.75
Methionine (%)	0.49	0.46	0.46	0.46	0.46
Calcium (%)	1.36	1.70	1.70	1.70	1.70
Phosphorus (%)	1.04	0.80	0.80	0.80	0.80

*A Vitamin mineral premix provides per kg diet: Vitamin A, 13.340 iu, vitamin D_3 2680 iu, vitamin E_{10}iu, vitamin K, 2.68 iu, Calcium pentothenate, 10.68mg, Vitamin B_{12} 0.022mg; Folic acid, 0.668mg; Choline chloride 400mg; Chlorotetracycline, 26-28mg; Manganese, 133.34mg; Iron, 66.68mg; Zinc, 53.34mg; Copper, 3.2mg; Iodine, 1.86mg; Colbalt, 0.268mg; Selenium, 0.108mg. ME= Metabolizable Energy (kcal/kg)

Table 2: Proximate Composition of Experimental Diets Containing Lablab Forage cut at Different Stages of Growth

	Lablab Forage cut at Different age (%)				
Parameters	**Control**	**6 week**	**12 week**	**18 week**	**24 week**
Dry matter (%)	90.07	92.37	94.92	95.00	96.05
Crude protein (%)	18.00	17.55	17.00	15.18	12.97
Crude fibre (%)	6.86	9.64	12.11	13.20	17.80
Ether extract (%)	4.90	4.66	4.42	2.98	3.55
Ash (%)	5.10	5.66	6.27	6.44	7.82
NFE (%)	64.14	62.49	61.06	60.55	57.86

NFE=Nitrogen Free Extract

Carcass evaluation
Four rabbits were randomly selected from each treatment based on the group average weight for carcass analysis. The animals were starved overnight before slaughtering at the Animal Products Laboratory, Department of Animal Science, Ahmadu Bello University, Zaria. The fur and the viscera were removed. The carcass was cut into prime cuts and each of the organs were removed. The dressing percentage was calculated as the ratio of the dress-out weight to live weight. The prime cuts and organ weights were each expressed as a percentage of the live weight.

Statistical analysis
Data generated in the study were subjected to analysis of variance using SAS Package Version 9 (12), and were significant differences existed, means where separated using the Duncan Multiple Range Test.

Results and Discussion
The proximate composition of lablab forage cut at different stages of growth (Table 3) showed that lablab forage cut at 24 weeks post germination had significantly ($P<0.05$) higher dry matter and crude fibre content compare to those cut at 6 and 12 weeks of age post germination. The progressive increase in the dry matter and crude fibre content as the forage material aged was expected and was in agreement with the reports of (13, 14). The authors attributed the increase in dry matter and crude fibre content as observed in the present study to rapid lignifications of the forage material as the plant advanced in age.

Table 3: Proximate analysis and metabolizable energy of lablab forage cut at different stages of growth

	Age of cutting of lablab forage (weeks)				
Parameters	**6**	12	18	24	SEM
ME (kcal/kg)	2509^{a}	2303^{b}	2110^{c}	2072^{d}	8.88
Dry matter (%)	93.89^{c}	94.31^{b}	95.03^{ab}	95.81^{a}	0.25
Crude protein (%)	17.10^{a}	16.99^{a}	16.60^{a}	9.11^{b}	0.05
Crude fibre (%)	22.10^{d}	26.83^{c}	29.78^{bc}	31.53^{a}	0.14
Ether extract (%)	0.86^{a}	0.83^{a}	0.60^{b}	0.15^{c}	0.02
Total ash (%)	8.23^{d}	9.07^{c}	9.12^{b}	11.43^{a}	0.01
NFE (%)	51.93^{a}	48.62^{b}	46.16^{c}	44.91^{d}	0.12

^{abc} = Means with different superscript on the same row differ significantly ($P<0.05$)
SEM = Standard Error of Mean ME= Metabilozable energy (MEkcal/kg)

The ash content of the forage materials followed the same trend as observed for the dry matter and crude fibre. On the other hand, crude protein, metabolizable energy, ether extract and nitrogen free extract showed a declining trend as the forage material became older. Lablab forage cut at 6 weeks post germination had significantly ($P < 0.05$) higher crude protein (17.10%), while 24 weeks old forage had the lowest crude protein (9.11%). The result of the crude protein range (17.10%) obtained in this study was in agreement with the mean value of (17.3%) reported by (4) in the same location and with the mean value of 17.2% reported elsewhere by (15). The trend observed for crude protein was in conformity with reports by (16, 17, 18) and is mainly attributed to dilution of the crude protein contents of forage crops by the rapid accumulation of cell wall carbohydrates at the latter stages of growth (19). Metabolizable energy values decreased from 2509kg at 6 weeks to 2072kg at 24 weeks of cutting. Ether extract decreased from 0.86% (6 weeks) to 0.15% (24 weeks) and nitrogen free extract also steadily declined from (51.93%) at 6 weeks to (44.91%) at 24 weeks.

The decline in crude protein and soluble carbohydrate content as the cutting intervals increased supported earlier observation by (16, 17, 18, 19). Generally, the proximate results and the calculated metabolizable energy supported harvesting of lablab forage at 12 weeks of age for optimum nutrient content to be used for tissue building by the animals.

Table 4: Effect of Lablab forage cut at different stages of growth on performance of weaner rabbit

	Age of Cutting of Lablab Forage (weeks)					
Parameters	Control	6	12	18	24	SEM
Initial weight (g)	541.67	541.67	541.67	541.67	541.67	0.00
Final weight (g)	1016.7^{b}	1025.5^{b}	1166.7^{a}	1133.3^{a}	1030.5^{ab}	57.09
Feed intake (g/d)	38.10^{c}	43.75^{c}	45.68^{b}	49.40^{b}	54.67^{a}	2.18
Weight gain (g/d)	8.34^{b}	8.93^{b}	14.32^{a}	11.01^{ab}	10.72^{ab}	1.03
Feed conversion ratio	4.57^{ab}	4.90^{ab}	3.19^{a}	4.49^{ab}	5.10^{b}	0.49
Feed cost/kg gain (₦)	280.50^{b}	256.00^{ab}	125.35^{a}	225.00^{ab}	186.45^{ab}	20.50
Mortality %	0	1	1	0	0	0.00

^{abc} = Means with different superscript on the same row differ significantly (P<0.05)
SEM = Standard error of mean ADWI= Ave daily water intake (ml)

Growth Performance of Weaner rabbits fed lablab forage cut at different stages of growth is presented in Table 4. There were significant differences (P<0.05) in final live weight, feed intake, weight gain, feed conversion ratio and cost per kg gain across the dietary treatments.

Generally, feed intake increased significantly (P<0.05) as the age at which the lablab forage was cut increased. This was expected and could be explained on the basis of the crude fibre and dietary energy intake. As lablab forage advanced in age, there was a progressive increase in the structural fibre which is made up of cellulose, hemicululose and insoluble lignin. The dietary energy on the other hand decreased as the age at harvest of lablab forage varied from 6 to 24 weeks (Table 3). The rabbits consumed more of the diet as the age at harvest of lablab forage increased in attempt to compensate for the low dietary energy associated with high fibre diets. This was in consonance with (20) who reported that increased crude fibre intake in monogastric animals can result in increased voluntary feed intake as a means of compensating for lower energy density of the diet.

Rabbits fed diets containing lablab forage cut at 12 weeks of age had significantly (P<0.05) better weight again and final live weight than those on other dietary treatments. The improved weight gain of rabbits fed diets containing lablab forage cut at 12 weeks of age compare to those on the control (without lablab forage) and diets containing lablab cut at 6 weeks of age was in agreement with (20, 21). These authors reported that fibre in a diet among other things improves feed intake, digestion by opening up concentrate material and better growth when fed at the optimum level of inclusion. Low fibre diets on the other hand predispose rabbits to caecal-colonic hypomotility and diarrhoea due to proliferation of pathogens as a result of carbohydrates overload in the hindgut. The dietary fibre intake of rabbits fed the control diet and 6-week old lablab forage based diets was below the minimum 12-13% dietary fibre requirement of rabbit and could be responsible for the poor weight gain and final weight of animals on these dietary treatments compared to those on lablab forage cut at 12 weeks based diet. Rabbits fed lablab forage cut at 18 and 24 weeks based diets had higher feed intake without commensurate increase in weight gain and final weight compare to those on 12 weeks old lablab forage based diets. The poor utilization of feed by rabbits fed lablab forage cut at 24 weeks of age could be attributed to high fibre and low protein content of the forage material. High fibre and low protein content of a forage material is an indication of poor quality. Increase in dietary fibre and consequently dietary feed intake as observed for rabbit fed lablab forage cut at 24 weeks based diets in this study has been associated with decreased digestibility and utilization of nutrients (19, 22). The depressed weight gain and final live weight observed in rabbits fed lablab forage cut at 24 weeks based diet could be as a result of its low protein content. High level of protein is essential for body growth. Feed conversion ratio (FCR) was best (3.19) on the 12 weeks old lablab forage and least on the 24 weeks old lablab forage based diet (5.10). This suggest poorer conversion of lablab forage cut at 24 weeks of age to weight gain compare to lablab forage cut at 12 weeks of age post germination. Rabbits on the control diet (without lablab forage) had the highest cost per gain (N280.50) compared to those fed lablab forage based diets. Feed cost and consequently cost per gain was observed to be reduced when unconventional, protein rich forage legumes such as soybean forage was used as a supplement in rabbit diets (23, 24). Cost per kg gain is a function of the feed conversion ratio. The better feed conversion ratio observed on rabbits fed lablab forage cut at 12 weeks of age could be responsible for the least cost per gain observed on rabbits fed lablab forage cut at 12 weeks compared to those fed lablab forage cut at 6, 18 and 24 weeks old. Generally, there is cost savings with the use of lablab forage cut at 12 weeks of age compared to other dietary treatments. No mortality was observed at the course of the experiment suggesting that there was no significant (P<0.05) effect of treatments on the health status of the animals.

Apparent nutrient digestibility of rabbits fed diets containing lablab forage cut at different stages of growth is presented in Table 5. Rabbits fed the control diet had the best apparent nutrient digestibility coefficient for all the parameters measured. However, when the apparent nutrient digestibility coefficient results was compared with the growth performance parameter (Table 3), it can be deduced that, although the nutrients were fairly digested by rabbits fed the control diet, they were not effectively utilized to promote optimum growth at the tissue level. Calhoun *et al.* (25) and (26) had reported that absorption of nutrients does not necessary imply that the nutrients were utilized.

Generally, apparent nutrient digestibility coefficient of Dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE) and ash for rabbits fed diets containing lablab forage cut at different age interval significantly (P<0.05) decreased as the forage material advanced in age. The apparent dry matter digestibility coefficient declined significantly (P<0.05) from 71.82% at 6 weeks to 56.66% at 24 weeks cutting interval post germination. Apparent crude protein digestibility coefficient for rabbits fed diets 1, 2 and 3 were similar (P>0.05) and significantly (P<.05) better than those fed diets containing lablab forage cut at 18 and 24 weeks of age. For crude fibre, rabbits fed control diet and lablab forage cut at 6, 12 and 18 weeks based diets were not significantly (P>0.05) different. However, animals fed diet 5 had significantly (P<0.05) lower digestibility of crude fibre compared to those for control, 6 and 12 weeks old forage based diets. For ether extract and ash apparent nutrient digestibility coefficient, only rabbits fed control diet differed significantly (P<0.05) with those fed lablab cut at 24 weeks old based diet.

The decline in apparent nutrients digestibility coefficient with advanced stage of cutting lablab forage observed in this study was earlier reported by (27) and also agreed with earlier results reported for lablab in the Northern Guinea Savanna Zone of Nigeria (28, 29, 30). Van Soest (19) indicated that the stage of maturity of a forage plant at harvest is one major factor that could affect digestibility of nutrients.

As forage plant matures, the amount of structural fibre and lignin increases. While the structural fibre components can be partially digested by animals, lignin is not easily digested. Adjei and Fianu (31) indicated that as the amount of structural fibre and lignin increases, digestibility of forage and other dietary nutrients by livestock reduced. Decrease in crude fibre digestibility with increasing level of fibre in the diets of rabbits has also been reported (27). The apparent digestibility of the crude protein in *lablab purpureus* forage has been reported for sheep (32), cattle (33) with coefficient in the range of 54.50 to 76.10%. The range of apparent crude protein (CP) reported for the present study was similar to the range reported by (34). Generally, trend observed for the apparent nutrient digestibility coefficients supported the growth performance results in this study. The haematological indices examined were generally not significantly (P>0.05) affected by the dietary treatments. (Table 6) Blood metabolites profile have been used widely to establish the health status of animals particularly when they are subjected to dietary treatments that has the tendency of affecting their wellbeing.

Table 5: Apparent nutrient digestibilities of rabbit fed diets containing lablab forage cut at different age interval (%)

Parameters	Age of cutting of lablab forage (weeks)					SEM
	Control	6	12	18	24	
Dry matter	86.82[a]	71.82[ab]	65.50[ab]	63.77[b]	56.66[b]	4.29
Crude Protein	72.48[a]	72.00[a]	71.99[ab]	71.89[b]	70.93[b]	3.27
Crude Fibre	72.31[a]	71.81[a]	70.00[a]	69.72[ab]	55.25[b]	4.30
Ether Extract	85.08[a]	80.94[ab]	75.95[ab]	65.97[ab]	62.83[b]	4.05
Ash	76.00[a]	75.40[a]	73.76[a]	68.63[ab]	64.34[ab]	5.54
NFE	69.34	68.74	67.84	60.90	52.72	5.17

abc = Means with different superscript on the same row differ significantly (P<0.05)
SEM = Standard error of mean

The total protein (TP), packed cell volume (PCV), haemoglobin (Hb), white blood cell (WBC) concentration values were within the normal range established for rabbits (35). The haematological values were also similar and within the range reported by (36) for rabbits. This could be an indication that the rabbits were healthy throughout the period of the experiment. The stage of growth at which lablab forage was cut had no negative effect on the health status of the animal.

Table 6: Haematological parameters of weaner rabbits fed lablab forage cut at different stages of growth

	Age of cutting of lablab forage (weeks)					
Parameters	Control	6	12	18	24	SEM
Packed cell volume (%)	40.50	46.50	46.90	41.00	42.00	1.53
Haemoglobin (%)	13.50	14.45	15.30	13.60	13.97	0.51
MCH (pg)	20.30	20.60	20.62	20.41	20.46	0.21
MCHC (g/dl)	33.33	33.22	33.24	33.17	33.26	0.03
White blood cell (%)	4.90	5.50	6.32	4.11	6.20	0.63
Total Protein (g/dl)	7.15	6.34	6.40	8.53	5.77	0.79

abc = Means with different superscript on the same row differ significantly (P<0.05)
SEM = Standard error of mean
MCH = Mean cell haemoglobin
MCHC = Mean cell haemoglobin contraction

The result on carcass and organ characteristics of rabbit fed diets containing lablab forage cut at different stages of growth is presented in Table 7. The differences among the dietary treatments were significant (P<0.05) for the live weight, carcass weight and dressing percentage. Animals fed diet containing lablab forage cut at 12 weeks post germination had relatively higher values for live weight, carcass weight and dressing percentage compared to control and diet containing lablab forage cut at 6 weeks of age. The values obtained for dressing out percentage was in the range of 45.46 to 53.19. These values were similar to 47.74 to 50.38% reported by (38) but lower than 69.49-73.98% obtained by (37). The small intestine length ranged between 273 to 288cm and were statistically similar among dietary treatments. In an earlier study, Asuquo (39) fed forages in mixed feeding regime and had small intestinal length of 269 to 290cm for weaned rabbits. The relatively longer large intestine observed in rabbits fed diet containing lablab forage cut at 12 weeks of age compared to those fed control or diet containing lablab forage cut at 6 weeks of age could be attributed to fibre. The weight of the major organs (heart, liver, kidney and lungs were significantly different (P>0.05) among dietary treatments. The weight of major prime cuts were also significantly different (P>0.05) among dietary treatment. However, the differences observed among dietary treatment for most of the prime cuts parts and organs did not follow a particular trend.

Table 7: Carcass characteristics of weaned rabbits fed lablab forage cut at different stages

	Age of cutting of lablab forage (weeks)					
Parameters	Control	6	12	18	24	SEM
Slaughter weight (g)	1050^{b}	1075^{b}	1175^{a}	1125^{ab}	1125^{ab}	23.76
Carcass weight (g)	536.40^{ab}	499.50^{b}	625.00^{a}	550.00^{ab}	560.00^{ab}	22.6
Dressing (%)	51.08^{a}	45.46^{b}	53.19^{a}	49.89^{ab}	49.78^{ab}	0.67
Length of Small intestine (cm)	278.50	273.00	288.00	283.00	278.50	12.44
Length of Large intestine (cm)	148.50^{ac}	141.50^{c}	178.50^{a}	118.50^{c}	153.50^{ab}	7.65
Prime cuts and organ weight expressed as a percentage of live weight						
Heart (%)	0.24^{a}	0.23^{ab}	0.24^{a}	0.21^{bc}	0.20^{c}	0.006
Liver (%)	3.13^{a}	2.74^{c}	3.21^{a}	2.92^{b}	2.93^{b}	0.041
Lung (%)	0.64^{bc}	0.47^{c}	0.85^{b}	0.82^{b}	0.57^{bc}	0.04
Kidneys (%)	0.81^{a}	0.70^{b}	0.84^{a}	0.84^{a}	0.70^{b}	0.02
Spleen (%)	0.06^{b}	0.06^{b}	0.07^{ab}	0.09^{a}	0.06^{b}	0.005
Shoulder (%)	17.58^{a}	16.35^{b}	17.33^{a}	16.51^{b}	17.36^{a}	0.190
Loin (%)	13.17^{a}	10.59^{b}	11.64^{b}	12.79^{a}	12.72^{a}	0.87
Thigh (%)	17.35^{a}	15.44^{b}	18.72^{a}	16.90^{ab}	18.19^{a}	0.36
Head (%)	9.20	9.25	9.74	9.56	9.63	0.30
Legs (%)	3.27^{b}	3.22^{b}	5.44^{a}	3.34^{b}	2.88^{b}	0.43
Skin (%)	7.00^{b}	7.59^{ab}	8.74^{a}	8.59	7.86^{ab}	0.35
Tail (%)	0.23^{b}	0.47^{a}	0.47^{a}	0.47^{a}	0.52^{a}	0.40
Weight of stomach (g)	1.25	1.33	1.35	1.33	1.38	0.30
Weight of Small intestine (g)	2.83	2.17	2.67	2.54	2.49	0.50
Weight of Large intestine (g)	3.45^{a}	2.79^{b}	2.36^{b}	3.45^{a}	3.32^{ab}	0.05

^{abc} = Means with different superscript on the same row differ significantly (P<0.05)

SEM = Standard error of mean

Conclusion and Applications

It was concluded that:

1. The dry matter (DM) and crude fibre (CF) values showed steady increase as the lablab forage advanced in age, while the crude protein (CP) content showed significant (P<0.05) decrease as the plant aged.
2. The best age to cut lablab forage for optimum performance in rabbit was found to be 12 weeks.

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