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Effect of Weeding Regimes on Chemical Composition of Lablab Purpureus in Semi-Arid Sokoto, Nigeria

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Abstract
A Field experiment was conducted in 2010 and repeated in 2011 cropping seasons to determine effects of weeding regime on chemical composition of *Lablab purpureus.* It was planted and weeded at four weeding regimes (weedy check, weeding once, weeding twice and weed free) laid out in a Randomized Complete Block Design (RCBD) replicated thrice. Results revealed that weed free regime produced the highest crude protein (24.8%) while weedy check produced the highest carbohydrate content of 55.9% and the highest lipid content of 24.8%. For 2010 and 2011 seasons and the combined analysis, weeding regime did not show any significant difference ($P > 0.05$) in all parameters except in crude fibre and weed dry weight.
Keywords: Weeding, Chemical Composition, Lablab

Introduction

Forages and fodder crops are of great importance in the development of Nigeria's livestock industry (Shiawayo and Tsado, 2011). The production of cultivated pastures in sufficient quantity aims at improving the availability of meat and other animal protein sources (Aganga and Tshwenyane, 2003). Lablab is a forage legume that has a number of qualities that can be used successfully as a feeding stuff either fresh or dry. It is palatable to livestock. During cultivation it possess the ability to out yield other crops, especially during the dry season and serves as cover crop (Murphy and Colucci, 1999).

Weeding is an agronomic practice largely based on herbicide applications which are most of the time harmful and cause environmental problems (Batish*et al.,* 2007;Kordali*et al.,* 2009). The use of aggressive cultivars however can be an effective cultural practice for weed control (Wicks *et al*., 2004;Mennan and Zandstra, 2005). All crops are affected by weeds to some extent, but the degree of damage caused depends on the species and circumstances during cultivation (Lavabre, 1991; Akobundu, 1993). As a consequence of the problem posed by weeds, more than half of the cultural practices required for crop production in the tropics are devoted to their control (Yayock*et al;* 1988)

Therefore this study is aimed at investigating the effect of weeding regime on chemical composition of Lablab.

Materials and methods

A field experiment was conducted during the cropping seasons of 2010 and repeated in 2011 at the Usmanu Danfodiyo University, Sokoto Teaching and Research Farm, Dabagi, (13^0 01'N; 5^0 15' E, 350 m a. s. l.). Sokoto lies in the Sudan Savanna agro ecological zone of Nigeria with erratic and scanty rainfall (Singh, 1995) that lasts for about 4 months (mid June to September) and long dry period (October to May). The annual rainfall is highly variable from year to year with an annual average of 700mm. Relative humidity is generally low for the greater part of the year (20 – 35% in January and increases to 60 – 80% in August) (Rao, 1983).

The treatments four weeding regimes (weed free, weeding once, weeding twice and weedy check). Treatments were laid out in a Randomized Complete Block Design (RCBD) and replicated three times.

Prior to planting the land was ridged at 80cm spacing using hoe. Sixty (60) kg P_2O_5 ha^{-1} was applied using SSP (18% P_2O_5). The fertilizer was applied by broadcast and incorporated immediately into the soil in accordance with the method of Nworgu and Ajayi (2005). The *Rongai* variety of *Lablab* was obtained from the National Animal Production Research Institute (NAPRI) forage seed store at Shika, Zaria, Nigeria. Before planting, seeds were soaked in warm water for 5 minutes to soften the seed coat and facilitate germination. Three seeds were dibbled (Nworgu and Ajayi, 2005) on the ridges to avoid water – logging (Murphy and Colucci, 1999). Manual weeding was adopted and carried out at three and six weeks after sowing. At week 12 after sowing, samples were taken from each plot. The samples taken were air dried, ground to pass through 1mm sieve and used to determine crude protein, crude fiber, lipid and ash content according to the methods of AOAC (1990).

Results and Discussion

Crude Protein (%)

Mean crude protein content as influenced by weeding regime is presented in Table 1. Result showed that the increase in crude protein had not been consistent. It also revealed that weed free samples of Lablab plant recorded the highest crude protein of 24.8%. This value is higher than the recommended crude protein level for dairy cattle at all stages of lactation. Lactating cows at early, mid and late lactation require 16 to 18%, 14 to 16% and 12 to 14% crude protein respectively (Joe and Ann, 2002). The result did not show any significant difference (P>0.05) in crude protein content for all treatments, between the two seasons and the combined analysis. This agreed with the report of Wiredu (1998) that crude protein content of Lablab was not influenced by weeding regime.

In the 2010 cropping season, crude protein content of Lablab plant under the forming weeding treatments ranged from 23.3 to 24.7%. Values obtained for the 2011 cropping season ranged from 23.6 to 24.8%.

Table 1: Crude protein content (%) of Lablab plant as affected by weeding regimes in 2010 and 2011 cropping seasons

Treatment	2010	2011	Combined
Weeding Regime			
Weedy check	24.1	23.6	23.9
Weeding once	23.5	23.8	23.6
Weeding twice	24.0	24.1	24.1
Weeding free	24.7	24.8	24.7
SE±	0.48	0.37	0.34
Significance	ns	Ns	ns

ns = not significant

Crude Fiber (%)

The mean crude fiber as influenced by weeding regime is presented in Table 2. Result showed that crude fiber contentof Lablab plant in 2010 was higher than in 2011 cropping season. This could be attributed to the erratic rainfall in the 2011 cropping season. The crude fiber content recorded was less than the recommended level of 17% for lactating cows (Joe and Ann, 2002). Weeding regime had no significant influence (P<0.05) on the crude fiber in the 2010 cropping season. There was however significant effect of weeding regime on crude fiber content of the crop in the 2011 cropping season (P< 0.05). This is in contrast with the findings of Awad and Elhassan (2009) that weeding treatment did not significantly affect on crude fiber content of *Medicago sativa.*

Table 2: Crude fiber content (%) of Lablab plant as affected by weeding regime in 2010 and 2011 cropping seasons

Treatment	2010	2011	Combined
Weeding Regime			
Weeding check	6.6	3.7[a]	5.2
Weeding once	6.4	3.3[b]	4.9
Weeding twice	6.3	3.7[a]	5.0
Weeding free	6.4	3.6[ba]	5.0
SE±	0.14	0.09	0.10
Significance	ns	s	ns

Mean in the column followed by same letters are not significantly different using DMRT at 5% level. ns = not significant, s = significant

4.13 Carbohydrate (%)

Carbohydrate content of Lablab plant as influenced by weeding regime is presented in Table 3. The carbohydrate content was higher in 2011 cropping season. Weed once recorded the highest carbohydrate of 55.9 % in 2011 cropping season, and weed free recorded the least (47.8%) in 2011 cropping season also. The carbohydrate recorded in this study is higher than what Liu (1997) recorded for *Glycine max (*L*)Merril.* Anon (2013b) reported 31% carbohydrate for *Alyscarpusvaginalis*DC. It also revealed that in both 2010 and 2011 and the combined analysis there was no significant effect (P> 0.05) of weeding regime on carbohydrate content.

Table 3: Carbohydrate (%) of Lablab as affected by weeding regime in 2010 and 2011 cropping season

Treatment	2010	2011	Combined
Weeding Regime			
Weedy check	48.8	54.4	51.6
Weed once	49.6	55.9	52.7
Weed twice	49.2	55.5	52.3
Weed free	47.8	54.1	50.9
SE±	1.06	0.54	0.54
Significance	ns	Ns	ns

Mean in the column followed by same letters are not significantly different using DMRT at 5% level. ns = not significant, s = significant

4.14: Lipid (%)

The mean Lipid content of Lablab as influenced by weeding regime is presented in table 4. It revealed that lipid content did not increase or decrease consistently throughout the period of the study. The result also showed 24.8% was the highest lipid content recorded by weed free.The lipid content recorded in this study is higher than 19 % that was reported by Liu (1997) for *Glycine max (*L*) Merril.*Alabi and Alausa (2006) reported 12.5% lipid of *Leucaena leucocephala.* It also revealed that both 2010 and 2011and the combined analysis showed no significant (P>0.05) effect.

Table 4: Lipid (%) of Lablab as affected by intra row spacing and weeding regime in 2010 and 2011 cropping season

Treatment	2010	2011	Combined
Weeding Regime			
Weedy check	24.1	23.6	23.9
Weed once	23.5	23.8	23.6
Weed twice	24.0	24.1	24.1
Weed free	24.7	24.8	24.7
SE	0.48	0.37	0.34
Significance	ns	Ns	ns

Mean in the column followed by same letters are not significantly different using DMRT at 5% level. ns = not significant, s = significant

4.7:Weed Dry Weight (g/m^2)

The mean weed dry weight as influenced by weeding regime is presented in table 5. It also showed that weed dry weight in 2010 is higher than in 2011. Weed cheek produced the highest weed dry weight. Weeding regime had significant difference in both 2010 and 2011 cropping seasons and the combined. This is in conformity with the findings of Moynul *et al*. (2003) who reported that weeding regime influences weed dry weight. While Tijani – Eniola and Akinnifesi (1998) reported that weed dry weight reduces as weeding increases.

Table 4: Weed dry weight (g/m^2)as affected by intra row spacing and weeding regime of Lablab

Treatment	2010	2011	Combined
Weeding Regime			
Weedy check	148.6^a	135.7^a	142.1^a
Weed once	104.8^b	63.9^b	84.3^b
Weed twice	28.1^c	15.6^c	21.8^c
Weed free	0.0^c	0.0^d	0.0^d
SE	13.55	4.07	6.95
Significance	s	S	s

Mean in the column followed by same letters are not significantly different using DMRT at 5% level. ns = not significant, s = significant

Conclusion

It could be concluded that weeding regime affected weed dry weight and crude fibre and no effect on Lablab purpureus (L) crude protein, carbohydrate, and lipid composition in semi-arid Sokoto.

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