GSAR Journal of Agriculture and Veterinary Sciences
ISSN: 3048-9075 (Online)
Abbreviated key title: Glob.J. Agri.Vet.Sci.
Frequency: Monthly
Published By GSAR Publishers
Journal Homepage Link- https://gsarpublishers.com/journal-gjavs-home/

Weeding Regime Effect on Growth and Yield of forage Lablab *Purpureus* (L.) In Semi-Arid Sokoto

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Article History

Received: 15/11/2025
Accepted: 22/11/2025
Published: 24/11/2025

Vol – 2 Issue –11

PP: -20-24

Abstract

A field experiment was conducted in 2010 and repeated in 2011 cropping seasons to determine effects of weeding regime on growth and yield of Lablab purpureus. Treatments consisted of a factorial combinations of three intra row spacing (20, 30 and 40cm) and four weeding regime (weedy check, weeding once, weeding twice and weed free) laid out in a Randomized Complete Block Design (RCBD) replicated thrice. Results revealed that in 2010 cropping season Weeding regime showed significance ($P < 0.05$) in weed dry weight and weed cover score. In 2011 cropping season, Weeding regime influenced ($P < 0.05$) leaf length at week 9 after sowing, weed dry weight, weed cover score and Crude fiber. Weed dry weight and weed cover score were significant ($P < 0.05$) in the two years combined analysis. It could be concluded that weeding once produced the highest dry matter yield of 1707.7 and 1711.2 kg/ha respectively.

Key words: *Weeding Regime, Lablab, Yield*

INTRODUCTION

Feed put forth a danger as the major component of livestock production in sustaining their productivity (Lamidi, &Ologbose 2014).One of the ways of increasing livestock production in Nigeria is to increase the area and quality of legume-based pastures. In the Sudano – Sahelian region availability of nutritious fodder is inadequate due to low and erratic rainfall and the long dry season extending from October to May (Sivakumar, 1990).

Weeds are unwanted plants which succeed in the struggle for existence in competition with crops (Lavabre, 1991). Weeds comprise the most undesirable aggressive and troublesome elements of the world's vegetation. They are plants which grow out of their proper places and whose virtues have not yet been discovered (Kazi*et al*., 2007). Also, Shah and Khan (2006) defined weeds as plants whose negative values are more than their positive values. They are also considered as plants growing at wrong place or where they are not desired (Leela, 2002). All crops are affected by weeds to some extent, but the degree of damage caused depends on the species and circumstances (Lavabre, 1991 and Akobundu, 1993). The detrimental effect of weeds on croplands has been recognized by farmers since the advent of agriculture. According to Terry (1983) weeds are very important pest often causing crop loses greater than those of other pests. As a consequence of large-scale problem posed by weeds, more than half of the cultural practices required for crop production in the tropics are devoted to the control of weeds (Yayock*et al*, 1988). The effect of weeds on forage growth hasbeen reportedin the establishment of any perennial, especially forages. (Mark & Renz, 2011)Hoy et al. (2002) reported that weeds reduced the establishment of alfalfa by 50%.

Lablab purpureus (lablab) is a multi-purpose crop used for soil improvement, soil protection, vegetable, fodder and weed control. (Schaaffhausen 1963; Kay 1979; NAS 1979; Wood 1983). With its viny habit, fast early growth, ability to grow with little applied water, Lablab can be effective to suppress weeds. Lablab and Mucuna suppressed striga weeds (KARI, 2004 and 2005). Lablab not only protects the soil but acts as a natural weed control (Schaaffhausen, 1963). Gbaraneh*et al* (2004) reported that the effective weed control associated with early under sowing of lablab could be attributed to the smothering effect of lablab forage cover. This study is aimed at studying the effect of weeding regimes on growth and yield of Lablab in the Semi-arid region of Nigeria.

Materials and Methods

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The field experiments were conducted in 2010 and repeated in 2011 cropping seasons at Teaching and Research Farm, Dabagi, Usmanu Danfodiyo University, Sokoto (13^0 01'N; 5^0 15' E, 350 m a. s. l.). Sokoto located in the Sudan Savanna agro ecological zone of Nigeria has irregular and minimal 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 over the years with an annual rainfall of 700mm. The temperature is also variable throughout the year and relative humidity is generally low for the greater part of the year which is about 20 – 35% in January and increases to 60 – 80% in August (Rao, 1983).

Treatments and Experimental Design

The treatments evaluated were 3 x 4 factorial combinations consisting of three intra – row spacings (20cm, 30cm and 40cm) and four weeding regimes (weed free, weed once, weed twice and no weeding). Treatments were laid out in a Randomized Complete Block Design (RCBD) and replicated three times.

Plots Layout

Thirty six (36) plots measuring 3.6m x 4m ($14.4m^2$) each were marked out and ridged at 80cm spacing

Soil Sampling and Analysis

Soil samples were taken before onset of the experiment at a depth of 0 - 15cm and 15 – 30cm from nine randomly selected points of the area to be cultivated using auger. The samples were used for physico – chemical analysis. Particle size analysis was conducted using hydrometer method (Boyoucus, 1951). Textural class was determined using textural triangle while total Nitrogen was determined by regular macro – Kjeldhal digestion technique (Jackson, 1964). Available phosphorus was determined using Bray N0.1 method. Potassium and sodium were determined using a flame photometer while magnesium and calcium were also determined by EDTA titration method. Cation Exchange Capacity (CEC) was calculated using ammonium acetate method (Bray and Kurtz, 1945).

Land preparation

The land was ridged at 80cm spacing using hoe prior to planting.

Source of seeds

A variety of Lablab Rongai was obtained from the National Animal Production Research Institute (NAPRI) forage seed store at Shika, Zaria, Nigeria.

Seed Scarification

To facilitate germination prior to planting seeds were soaked in warm water for 5 minutes to soften the seed coat.

Sowing

Three seeds were dibbled (Nworgu and Ajayi, 2005) on the ridges because it does not tolerate water – logging (Murphy and Colucci, 1999) at 20cm, 30cm, and 40cm spacing.

Fertilizer application

60kg P_2O_5 ha^{-1} was applied using SSP (18% P_2O_5). The fertilizer was broadcasted and incorporated immediately into the soil in accordance with method used by Nworgu and Ajayi (2005).

Weeding

Manual weeding was carried out at three weeks after sowing for plots weeded once, at three and six weeks for plots weeded twice and whenever necessary for plots that are weed free.

Harvesting

At 12 weeks post planting, the crop was harvested 5cm above ground level (net plot) for each replicate plot.

Data collection

Data was recorded at 3, 6, 9 and 12 weeks after sowing (WAS). Five randomly selected plants were tagged for measurement of growth parameters in the subsequent weeks of investigation.

Weeds dry weight

At the 12^{th} week after sowing, weeds were collected from each of the plots and were taken to the Department of Biological Sciences, Botany Unit for identification. A $1m^2$ quadrat was placed in three randomly selected sites systematically in each plot, weeds found were uprooted, weighed and average was taken.

Weeds cover score

Weeds cover score was determined by visual assessment at the 12^{th} week. This was done with a scale of one to five (1 - 5) where, one represents no weed cover and five represents complete weed cover (Sarkindiya and Yakubu 2006).

Stand establishment count

The mean stand establishment count as influenced by weeding regime of Lablab is presented in table 1. Weeding did not manifest any significant effect (P>0.05). The non-significant effect observed in the present study showed that the type of weeds present in the trial site were not too aggressive to smother out the Lablab plant. This proved that Lablab competed favourable with the weeds at establishment. Ahmed et al, 2009 reported the insignificant effect of weeding regimeon stand establishment count of Sesame in 2 planting seasons.

The mean leaf width as influenced by weeding regime is presented in figure 1. The result showed that leaf width increased linearly from week 3 to 12 after sowing. The results of this study showed that 2010 cropping season recorded wider leaf width compared to 2011, possibly as a result of more rainfall recorded in 2010 than in 2011. It also revealed that in both the 2010 and 2011 cropping seasons and the combined analysis there was no significant effect (P> 0.05). Weed free produced the widest leaf (8.5 cm). This was higher than what Malami and Abdullahi (2007) reported 7.72 and 6.9 cm respectively of the same crop in the same environment.

Leaf Length (cm)

The mean leaf length as influenced by weeding regime is presented in figure 2. The result showed that leaf length, in respective of the treatments, increased linearly from week 3 to week 12 after sowing. It also revealed that in the 2010 and 2011 cropping seasons and the combined analysis there was

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no significant effect (P> 0.05) recorded for intra row spacing. Weeding regime did not show any significant effect (P> 0.05) except for week 9 in the 2011 cropping season. This could be as a result of pest attack encountered in the 2011 cropping season. The leaf length in 2010 cropping season are higher than the ones in 2011 cropping season, this could be as a result of higher rainfall experienced in 2010 than in 2011 (Appendix I). The longest leaf recorded was 9.8 cm for weeding twice and this was slightly lower than the value reported by Malami and Suleiman (2007) for the same crop (9.86cm) in the same environment.

Plant Height (cm)

The mean plant height as influenced by weeding regime is presented in table 2. The result showed that plant height increased with increase in the weeks of data collection. Weeding regime had no significant effect (P > 0.05) on the plant height of Lablab in both 2010 and 2011 cropping season and the combined analysis. Ahmed et al (2009) reported significant effect of weeding regime on plant height in Sesame. Ahmed et al (2011) also reported that weeding affected growth parameters of Peanut. Lamptey et al (2015) recorded significant effect of weeding on plant height of Soya bean.

Plant cover (cm)

The mean plant cover as influenced by weeding regime is presented in table. The table showed that plant cover increased as the weeks of data collection increased. It also revealed that in both the 2010 and 2011 cropping seasons and the combined analysis there was no significant (P> 0.05) effect of weeding regime. Ahmed et al (2011) reported effect of frequency of weeding on growth parameters of Peanut.

Dry Matter Yield (kg/ha)

The mean dry matter yield (kg/ha) as influenced by weeding regime is presented in table 5. Rainfall data recorded for the study area indicated that total rainfall during 2010 was 1146.7 mm compared to 557.8 mm in 2011, therefore 2010 cropping season is expected to have higher dry matter yield. The result of this study also revealed that weeding regime did not show significant (P > 0.05) effect on dry matter yield of lablab in both 2010 and 2011 cropping seasons and the combined analysis. This could be attributed to the fact that Lablab has the ability to suppress weeds (Friday *et. al.*, 2003) However it revealed that weeding once produced the highest dry matter yield of 1711.2 kg/ha. Takim and Uddin (2010) reported a reduced dry matter yield of cowpea was associated with unweeded plots.

Conclusion.

It was concluded from this study that weeding regime does not affect growth parameters of Lablab purpureus(L) under Sokotoenvironment because the legume's ability to smoother weeds and weeding once has the highest dry matter yield (1711.2 kg/ha).

Table 1: Stand establishment count of Lablab as affected by weeding regime

Treatment	2010	2011	Combined
Weeding Regime			
Weedy check	30.9	30.9	30.9
Weed once	31.2	29.1	30.2
Weed twice	30.2	28.2	29.2
Weed free	31	29	30
SE±	0.67	0.95	0.50
Significance	ns	ns	ns

Table 2: Plant height (cm)of Lablab as affected by weeding regime

Treatment	2010				2011				Combined			
	Wk3	Wk6	Wk9	Wk12	Wk3	Wk6	Wk9	Wk12	Wk3	Wk6	Wk9	Wk12
Weeding Regime												
Weedy check	12.4	26.0	37.7	38.5	10.0	10.9	13.7	18.1	11.2	18.5	25.7	28.3
Weed once	14.3	29.7	40.4	43.4	9.8	12.0	21.0	24.1	12.1	20.9	30.7	33.8
Weed twice	12.5	27.1	36.1	39.7	9.0	11.4	15.2	17.5	10.8	19.3	25.7	28.6
Weed free	12.5	26.2	33.1	36.5	8.9	11.0	21.8	24.9	10.7	18.6	27.5	30.7
SE	1.62	2.30	2.25	3.11	0.42	0.76	2.40	2.40	0.80	1.26	2.00	2.43
Significance	ns	Ns	ns	ns	ns	ns	ns	ns	ns	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, wk = week

Table 3: Plant cover (cm) of Lablabas affected by intra row spacing and weeding regime

Treatment	2010				2011				Combined			
	Wk3	Wk6	Wk9	Wk12	Wk3	Wk6	Wk9	Wk12	Wk3	Wk6	Wk9	Wk12

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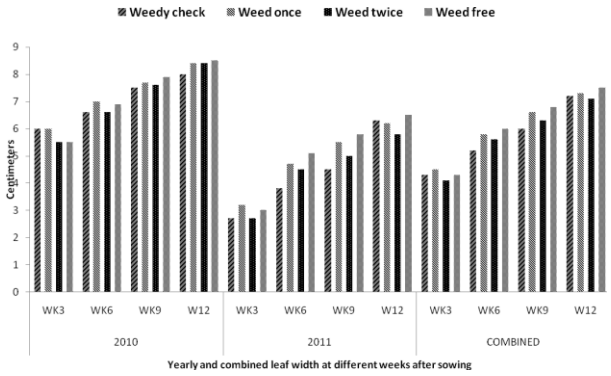
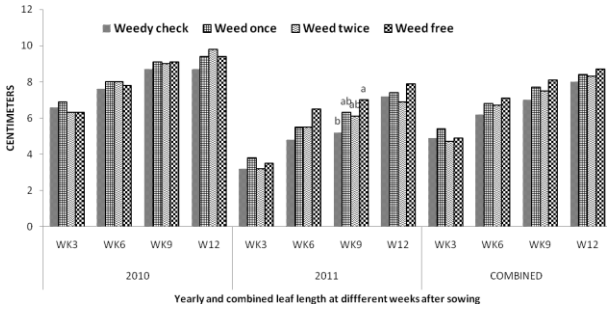
Weeding Regime												
Weedy check	16.8	20.2	29.9	34.4	7.4	10.9	11.2	17.7	12.1	15.5	20.6	26.1
Weed once	16.9	21.0	30.0	36.4	8.2	14.2	15.7	18.0	12.6	17.6	22.9	27.2
Weed twice	16.2	22.1	27.8	38.7	6.5	12.7	15.8	18.1	11.3	17.4	21.8	28.4
Weed free	16.6	20.2	33.2	44.7	7.3	14.5	16.8	20.1	12.0	17.4	25.0	32.4
SE±	0.72	1.52	4.60	5.30	0.55	1.21	1.52	1.91	0.40	0.92	2.39	3.00
Significance	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

Interaction

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





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