WEED SUPPRESSIVE POTENTIALS OF SELECTED COVER CROPS IN MAIZE PRODUCTION AT JALINGO, TARABA STATE, NIGERIA

[1]Michael* G. C and H. [2]Tijani-Eniola
[1]Department of Agronomy, Taraba State University P.M.B 1167 Jalingo, Taraba, Nigeria.
[2]Department of Agronomy, University of Ibadan, Ibadan, Nigeria.
*Corresponding: chukudimichael@yahoo.com

Abstract
Field experiment was conducted in the rainy season, 2004 at the Taraba State College of Agriculture Teaching Farm, Jalingo, Nigeria to evaluate selected cover crops for weed management in maize production. There were 10 treatments replicated three times in a randomized complete block design. The treatments included seven cover crops: Akidi (AKD), *Vigna unquiculata sub-sp sequipedalis,* melon (MLN), watermelon (WML), sweet potato (SPT), cowpea (IT89KD288) (CWP), pumpkin (PMK) and fluted pumpkin, *Telfairia occidentalis* (TLF). Recommended hand weeding(3+6 WAP) (RHW), weedfree (weeded weekly) (WF) and unweeded (UC) were the control plots. Data collected include growth and yield parameters of maize, ground coverage of cover crops, weed density and biomass. These were analysed using descriptive statistics and ANOVA ($p = 0.05$). The result shows that weed density at 12 WAP in WF (5.3/m^2) and RHW (14.0/m^2) were not significantly different from values obtained in TLF(12.0/m^2), AKD (16.6/m^2), SPT(20.6/m^2), and CWP (22.6/m^2) treated plots. The percent weed biomass reduction of 98.5%, 91.5%, 89.3%, 83.3%, 74.3%, 73.3%, 63.1% and 39.7% were recorded respectively in WF, TLF, RHW, AKD, CWP, SPT, PMK and WML plots respectively when compared to UC. The weed suppressive potential was in the order AKD > SPT > CWP > MLN > WML > TLF > PMK. The highest maize grain yield of 5.3 t/ha, obtained in AKD plot was significantly higher that in SPT (3.0 t/ha) plot.

Key words: Weed suppressive potential, Ground coverage, Maize, Cover crops, Hand weeding.

Introduction

Food security is a concern of global dimension which agriculture must face, especially in developing countries where population growth seems unchecked. The success in achieving the dreamed food sufficiency is closely linked with effective weed control as it complements the effective utilization of all other crop production resources and according to Holm (1971) "more energy is expended for weeding of man's crop than for any other single human task".

Maize is the most widely cultivated species (Purseglove, 1983) with highest yield per hectare when compared with other major cereals (FAO,1991). Maize is the major diet among the people of Taraba State which is reflected in its production in all the 16 local government areas of the state (Michael and Tijani-Eniola, 2009), displacing root and tuber meals to a great extent.

In Nigeria, low maize grain yield can be attributed to fertility inadequacy, but weed seems to be a major factor affects efficient utilization of all other resource.

Weeds (which constitute about 250 flowering plant species interfering with human activities) have been identified as the number one pest farmers must consistently contend with in over eighty percent of common crops in Nigeria agriculture (Ayeni,1991)

Weeds cause reduction in crop yield, crop quality, consume 30-50% of the total labour budget ((Babalola, 2002). Though it is the most underestimated pest in tropical agriculture, it accounts for about 42% of the total pest loses in field crops, cause 18-100% crop yield losses (Akobundu, 1991;IITA, 1987) In maize uncontrolled weed has been estimated to 40-60% yield loss.

The quest for increased productivity of maize due to its place in food, feed, fuel and industries is growing. Both intensive (use of improved varieties, agrochemicals) and extensive (increase in hectarage) strategies are being used but the major option for small scale farmers remains increasing the cultivated land area (Adegbidi *et al.*,1991).

To minimize yield loss by weed, a number of weed management options has been suggested (Akobundu, 1987). These include manual, mechanical, biological and integrated methods.

The use of cover crops is part of farming culture already and has been chosen for various beneficial potentials considering Taraba conditions e.g women use the tender leaves of these creepers for cooking, Cover crops reduce growth and competitiveness of weeds (Moore *et al*., 1994; Akinyemi and Tijani-Eniola, 1997), enhance soil fertility and prevent soil

erosion. The potentials of melon (Wahua, 1985; IITA, 1979, Obiefuna and Ndibizu, 1983), vegetable cowpea (Okpara, 2000) sweet potato (Akinyemi 1989) and *Telfaria occidentalis* (Akobundu, 1987) for use in weed management have been reported. This age of ecoagriculture for soil, crop and environmental sustainability calls for effective usage of cover crops in order to eliminate the need for herbicide in weed management. The use of cover crops like melon, cowpea, groundnut and pumpkin for weed control in maize farms is yet to be adequately investigated in the study area.

The objectives of this study were:

- To evaluate the effectiveness of selected creepers (melon, water melon, pumpkin, cowpea, potato, telfairia, akidi) for weed management in maize.
- To compare the effectiveness of cover crops with the recommended and weekly hoe weeding practices.

Materials and Methods

Experimental site

The field experiment was undertaken between May and August, 2004 at the Taraba State College of Agriculture, Teaching Farm, Jalingo. Jalingo is located on latitude $8^0$50'N and longitude $11^0$50'E in Guinea Savanna zone. Jalingo has a wet and dry tropical climate with rainy season of about 150 days, average rainfall of 700mm – 1000mm and temperature of about 27^0C

The rainy season is between May and October while the dry season is from November to April. The soil is described as being in the savanna derived from Calcareous rocks in ferro-magnesium mineral-lithormophic vertisols (USDA, 1975).

Before the experiment, the field had been used for the cultivation of groundnut. Among the prominent weeds were *Andropogon tectorum Schum; Commelina benghalensis L; Tridax procumbens Linn; Euphorbia hirta Linn; Aspilia Africana (pers), Digitaria horizontalis Wild, Cyperus rotundus, Striga hermonthica* (Akobundu and Agyakwa, 1987).

Experiment treatments and design

There were 10 treatments replicated three times in a randomized complete block design. The treatments included seven cover crops: Akidi (AKD), *Vigna unquiculata sub-sp sequipedalis,* melon (MLN), watermelon (WML), sweet potato (SPT), cowpea (IT89KD288) (CWP), pumpkin (PMK) and fluted pumpkin, *Telfairia occidentalis* (TLF). Recommended hand weeding (3+6 WAP) (RHW), weedfree (weeded weekly) (WF) and unweeded (UC) were the control plots.
Plot size was 3m x 3m ($9m^2$) Total Land area = 13m x 39m = $507m^2$

Land preparation and planting

The whole project site was cleared, ploughed and harrowed manually. A commercial early maturing maize variety (TZEE-W) of the premier seed company was planted at a spacing of 0.75m x 0.25m in all the plots. Cowpea (IT89KD288) obtained from IITA, Ibadan, a vegetable Cowpea (Akidi), melon, , *Telfairia occidentalis,and* sweet potato vines were planted at 0.75m x 0.75m while pumpkin and water melon were planted at 0.75m x 1.5m. The crops-maize and cover crops were planted at the same day, June 2nd, 2004.

Cultural practices

Supply and thinning were done about two weeks after planting. Weeding were carried out according to the treatment. The cover crops treatments were weeded at three WAP to allow for the establishment of the cover crops. The RHW plots were weeded 3 and 6 weeks after planting.

NPK 20:10:10 was applied to the maize at 5 and 7th weeks after planting at the rate of 5.5g/plant each time.

Data collection

Data were collected fortnightly starting from 3 weeks after planting (3 WAP) for all growth parameters from four randomly selected maize and three randomly selected cover crops excepting the boarder rows.

Maize parameters

The growth parameters taken included percent germination, plant shoot height, plant girth, number of leaves, leaf area index, days to fifty percent tasselling and leaf senescence (Leaf with more than 50% yellowish)

Yield and yield components such as number of cobs, the fresh weight of unshelled maize were collected for the four sampled plants.

The maize was harvested at physiological maturity with a moisture content of about 35% and the dry weight was estimated at 15% moisture content. The percentage shelling was determined as the ratio of the shelled grain to unshelled maize.

Cover crops parameters

Ground coverage: the percentage groundcover was taken at 5WAP and at harvest using 0-100% scale with 0% indicates no coverage while 100% indicate full or total coverage. The average of five independent raters was used at harvest.

Relative weed suppressive potential: Ground coverage at 5 and 12 WAP, weed count, weed dry biomass, weed control rating were used to set appropriate rank and rank summation indices (RSI)

Weed parameters

Weed density: weed count was made from two randomly selected quadrats (50cm x 50cm) at harvest for all treatments and the average expressed as number per square meter.

Weed biomass: fresh and dry matter of the quadrats were obtained and expressed as grams per square meter (g/m^2) for all treatments at 12 WAP except cover crop units where it has been earlier taken at 6 WAP.

Weed control rating: The average of the visual rating by five independent raters using a scale of 0-100% (0% for no weed control, 100% for full weed control) was obtained at harvest in addition to that obtained at 6 WAP.

Data analysis
The data obtained from the field experiments were subjected to analysis of variance (ANOVA) and the means were compared using the Duncan's Multiple Range Test (DMRT).

Results

Growth parameters

Plant height
The rate of growth peaked at 9WAP and then declined for most treatments (Table 1). No significant differences were observed except at week 5 and 11 WAP. Plant height in watermelon and Akidi (105cm) at 5WAP were significantly taller than in sweet potato treatment (84.7cm) and weed free plot (88.3cm).

At 11 WAP the height of maize in melon (230cm) was significantly higher than the heights in sweet potato, pumpkin, recommended hand weeding, weed free and unweeded check treatments.

Plant girth
Table 2 shows the girth of maize plant as influenced by different cover crops and hoe weeding treatments. The girth of maize in most treatments peaked at 7WAP and then declined. At 5WAP, *Telfairia* treatment showed significantly larger girth (6.80cm) than in SPT, (4.66cm), CWP (5.25cm), PMK (5.28cm), RHW (5.29cm), the weed free (4.77cm) and unweeded check (4.78cm). The largest girth was observed in *Telfaira* (7.11cm) at 7WAP, followed by watermelon (5.58cm) and AKD (5.54cm).

Number of leaves
The number of leaves of maize under various cover crops treatments are shown in Table 3. The maximum number of leaves of 12 was observed for TLF and AKD at 9WAP and comparable with RHW, weed free and unweeded check.

Leaf area of maize
The leaf area of maize under different cover crops and manual hoe weeding methods treatments are shown in Table 3. Significant differences were observed at 3 and 11 WAP. There was a general increase in leaf area from planting till 9WAP for all the treatments except in SPT, AKD, TLF and unweeded plot. The highest leaf area was obtained in *Teljairia* and Akidi plot at 7WAP. At 11 WAP, only the leaf area of maize in TLF treatment ($6446cm^2$) was significantly larger than leaf area of unweeded check ($4070cm^2$) , CWP ($3684cm^2$) and melon ($4010cm^2$).

Leaf area index
Table 5 shows the leaf area index of maize under different weed management treatments. The trend shows a rapid growth between 3 and 7WAP, followed by a decline in all treatments except MLN, CWP, which peaked at 9WAP. Significant difference was only observed at 11WAP. The LAI of maize in the TLF treatment (3.43) was only significantly greater than that under the CWP treatment. However the peak LAI of maize was obtained in TLF treatment (3.51) at 7WAP; followed by Akidi (3.49) and watermelon (3.37).

Effect of cover crops on the emergence and days to 50% tasselling
Table 6 shows the % emergence and days to 50% tasselling of maize under various cover crops treatments. The F-test indicated that no significant difference in these two parameters could be associated with the treatments. The highest emergence (96.4%) was observed in the melon treatment, and the least (85.1%) on the plot treated with pumpkin. The days to 50% tasselling ranged between 53 days (*Telfairia*), and 60 days in watermelon.

Effect of cover crops treatments on total weed count at harvest
The effect of the various treatments on the number of grasses, broadleaves and total weed count is shown in Table 7. The total weed count at harvest in pumpkin treatment (40/m^2) was significantly higher than weed free, RHW, and TLF treatments having 5.3, 14.0 and 12.0 weeds per square meter respectively. The weed count in pumpkin (40/m^2), MLN (34.7/m^2) and WML (30.7/m^2) and unweeded check (30/m^2) were significantly higher than the weed free treatment. The percentage weed count reduction of 82.5%, 60%, 53.3%, 44.7%, 31.3%, and 24.1% were observed in WF, TLF, RHW, AKD, SPT and CWP plots respectively. The MLN and WML plots were comparable with the unweeded check, since both were dead and the plot bare at harvest.

Effect of cover crop weed management treatment on weed dry matter at harvest
The weed dry matter in the unweeded check (75.12g/m^2) was significantly higher than those obtained in all the treatments except melon (Table 8). The percent weed dry matter reduction of 98.5% (WF), 91.5% (TLF), 89.3% (RHW), 83.3% (AKD), 74.3% (CWP), 73.3% (SPT), 63.7% (WML), 63.1% (PMK) and 39.7% (MLN) when compared with the unweeded check.

Effect of cover crops on yield of maize
Table 9 shows the yield and yield components of maize. No significant difference was observed in maize cob yield among all the treatments. Cob yield ranges between 5.8t/ha (in RHW, SPT, CWP) and 7.7t/ha in Akidi treated plots. Maize grain yield in Akidi treated plots (5.23t/ha) was significantly higher than that obtained in sweet potato treated plots. These were comparable to grain yield obtained in RHW and WF

Effect of cover crops
The results showed that cover crops did not significantly reduce yield when compared with hand weeding under this experimental condition where fertility seem to be adequate. Watermelon treatment gave the highest shelling percentage (74.4%) which was significantly better than SPT (51.6%) but comparable with the rest of the treatments.

Effects of cover crops treatments on number of cobs, 100 seeds weight and senescence of leaves
Table 10 shows the number of harvested cobs/ha, weight of 100 seeds, and number of non-productive leaves at harvest under various treatments. No significant difference was observed in these parameters due to the treatments Melon, Akidi, pumpkin and Recommended Hand weeding gave the highest cob number (58,670 cobs per hectare each) followed by the rest having 53, 333 cobs per hectare. The 100 seed weight ranged between 12.04g in sweet potato (SPT) and 14.66g in *Telfairia.* The unweeded check has the highest number of senenced leaves (298,660/ha) while the least was (197,330/ha) melon treatment.

The emergence percentage, ground coverage and weed control rating of selected cover crops
Table 11 shows the percentage ground coverage at 5 and 12 WAP and the weed control rating at harvest. There were significant differences in ground coverage among the cover crops ground coverage and weed control rating. At 5WAP, melon covered 80% of the plot (1.44m^2/week), this was significantly higher than the rest. Next to melon were Akidi, sweet potato, and cowpea covering 1.02m^2, 0.96m^2, 0.84m^2 per week respectively. The least coverage was observed in *Telfairia* (0.3m^2), pumpkin (0.23m^2) and water melon (0.18m^2) per week. The order MLN>AKD>SPT>CWP>TLF>PMK>WML was observed.

At harvest (12WAP) melon and water melon were dead. The ground coverage of cowpea was the highest. ($1.14m^2$/wk) followed by sweet potato ($1.1lm^2$/wk). These were significantly ($P < 5\%$) higher than Akidi ($0.9m^2$/wk), *Telfairia* ($0.29m^2$/wk). The least was pumpkin ($0.13m^2$/wk).

No significant differences were observed in the level of weed control achieved among cover crops. These were comparable with RHW and WF. However cowpea, Akidi and sweet potato achieved over 80% weed control when compared with the unweeded check.

The weed supressing potentials

The weed supressing potentials of selected cover crops is presented in Table 12. The relative ground cover, weed control rating, total weed density and biomass used to set the relative submission index indicates that Akidi was the best in terms of weed management followed by sweet potato and cowpea.

Discussion

Generally, there was no significant difference in all the growth parameters (germination percent, days to 50% tasselling, height, girth, number of leaves, leaf area and leave area index) except for slight differences at early and late growth phase.

This show that weed was not the only factor that affected the growth of maize. The greater height observed in some cover crop treated plots like water melon and Akidi at 5WAP could be probably due to competition for light arising from the higher plant densities in these treatments leading to etiolation. Okpara (2000) found similar effects in maize and vegetable cowpea.

The increase in height of maize in melon treated plots when compared with SPT, PMK, RHW and the controls reflected the senescences of melon at about 6WAP which allowed enhanced growth during the later period as the discomposed materials was now available for maize alone. Similar reasons explained why *Telfairia* treated plots had bigger stem girth.

The absurdity in the leaf area and leaf area indices under unweeded control when compared with weed free at 3WAP could be attributed to high level of soil fertility of the field leading to reduction in the depressive effects of weed. However, at 11WAP the significantly larger leaf area of maize in plots treated with *Telfairia* over that of cowpea could be due to higher level of competition imposed by the cowpea on maize, *telfairia* being a slow growing crop.

The weed control under the cover crops does not affect maize yield in terms of number of cobs, cob yield when compared with the controls and the recommended hand weeding. This could be attributed the mild effect of weed under high fertility condition.to Lindert (1979) comparing systems of weed control in maize and soybeans, implied that when moisture and fertility were not a problem, hand weeding may not be better than slashing in terms of yield. Moody cited by Adam (1976) reported that intensity of land use and the fertility status of soil affect the extent of yield losses in maize. Most of the cover crops CWP, AKD, SPT reduce weed counts and weed dry biomass when compared with the unweeded check. In terms of ground cover at earlier phase of the maize growth, the order MLN>AKD>SPT>CWP>TLFPMK>WML was observed. This can be attributed to high germination, easy and fast establishment of melon growing, but considering other attributes necessary for weed suppression the order changed. The order of weed suppressive potential AKD>SPT>CWP>MLN>WML>TLF>PMK reflected by several attributes like ground coverage, weed control rating, weed count/density and weed dry matter reduction. Melon weed supressing ability has been reported in by Wahua (1985), Asoegwu (1987) and Obiefuna (1989).

Melon covering about 80% of the ground in about 5 weeks would have certainly been the best but it was shortlived and then weed took over, this was very evident in very high cob yield of 6.46t/ha and very low grain yield and shelling percentage. Thus, melon maybe better in vegetables that has short gestation period. This poor biomass partitioning in melon plots can be attributed to later weed infestation.

By late growing period 6 – 12 WAP cowpea and sweet potato were best covering at $1.14m^2$/wk and $1.11m^2$/wk respectively. In terms of visual rating, all were equally good because the weeding at 3 and 6 WAP before weed sampling must have helped them. The maize grain yield in akidi plot which was the highest 5.23t/ha was significantly higher than the yield in plots were weed was supressed with sweet potato possibly because while Akidi supply additional nutrients through nitrogen fixation, sweet potato cannot and may equally be more demanding in terms of nutrients especially at its rapid growth phase. Yield reduction under sweet potato has been reported by Akinyemi (1989). This is due to inter specific competition for nutrient, moisture and/or space. The significantly higher percent shelling of maize in plots treated with water melon over that of sweet potato may be due to reduced population and the fact that water melon dies off at the early stage of maize growth.

Conclusion

Akidi had the highest weed suppressive potential and maize grain yield of 5.3 t/ha in this trial and thus recommended.

Acknowledgement

The authors wish to appreciate the Tertiary Education Trust Fund (TETFUND) through the management of Taraba State University, Jalingo for sponsoring my participation in this conference.

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Table 1: Effect of cover crops on height of maize

Treatment	Height (cm) (WAP)				
	3	**5**	**7**	**9**	**11**
MLN	47.03	93.23ab	177.18	203.36	230.63a
WML	47.60	105.02a	163.39	196.61	200.4abcd
SPT	43.63	84.72b	146.09	282.16	164.35e
CWP	44.15	92.13ab	164.60	213.45	211.00abc
AKD	47.33	105.15a	189.84	212.16	219.59ab
PMK	45.14	96.89ab	165.97	193.78	194.06bcde
TLF	46.64	95.57ab	175.03	198.57	216.05abc
RHW	43.49	94.79ab	170.67	179.55	193.65bcde
CTL (WF)	43.21	88.34b	159.40	179.55	186.68cde
CTL (UC)	50.56	98.17ab	173.77	175.59	177.41de
	NS		NS	NS	

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT
NS = Not significant

Table 2: Effect of cover crops treatment on girth of maize

Treatment	Girth (cm) (WAP)				
	3	**5**	**7**	**9**	**11**
MLN	2.57	5.3ab	5.64	6.36	6.02
WML	2.71	5.58ab	7.02	6.65	6.22
SPT	2.58	4.66b	6.21	6.20	5.47
CWP	2.49	5.25b	6.28	6.08	5.60
AKD	3.74	5.54ab	7.03	6.54	5.53
PMK	2.48	5.28b	6.67	6.36	5.99
TLF	2.48	6.80a	7.11	6.32	5.72
RHW	2.52	5.29b	6.92	6.34	6.12
CTL (WF)	2.27	4.77b	6.16	6.28	5.64
CTL (UC)	2.56	4.78b	6.22	5.57	5.33
	NS		NS	NS	

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT
NS = Not significant

Table 3: Effect of cover crops treatment on number of leave of maize

Treatment	Leaf number (WAP)				
	3	**5**	**7**	**9**	**11**
MLN	7.08	9.17	11.67	11.83	10.92
WML	7.50	10.33	11.67	11.67	10.22
SPT	7.92	8.75	11.00	11.50	10.08
CWP	7.17	9.83	10.67	10.83	9.83
AKD	7.58	9.83	11.50	12.17	11.83
PMK	7.08	9.92	11.50	11.08	11.87
TLF	8.00	10.08	11.67	12.19	11.27
RHW	7.25	10.33	11.08	11.00	10.47
CTL (WF)	7.67	9.83	11.17	10.78	9.70
CTL (UC)	8.17	10.00	11.56	10.53	9.55
	NS	NS	NS	NS	NS

NS = Not significant

Table 4: Effect of cover crops weed management treatment on leaf area of maize

Treatment	Leaf area (cm^2) x `00 WAP				
	3	**5**	**7**	**9**	**11**
MLN	7.20ab	27.04	39.45	59.06	40.10bc
WML	7.10ab	41.47	51.89	60.14	52.53abc
SPT	5.59ab	22.28	59.01	46.44	43.13abc
CWP	5.09ab	25.48	41.96	44.16	36.84c
AKD	6.59ab	38.77	65.30	58.03	48.16abc
PMK	6.02ab	34.60	48.72	54.63	58.82ab
TLF	7.42ab	35.49	65.84	59.01	64.46a
RHW	6.06ab	34.90	47.36	63.49	52.94abc
CTL (WF)	5.06b	34.00	44.26	38.94	42.89abc
CTL (UC)	7.63a	33.46	53.51	52.50	40.70bc
		NS	NS	NS	

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT
NS = Not significant

Table 5: Effect of cover crops weed management treatment on leaf area of index (LAI)

Treatment	LAI (WAP)				
	3	**5**	**7**	**9**	**11**
MLN	0.38	1.44	2.10	3.15	2.14ab
WML	0.38	2.22	3.37	3.21	2.74ab
SPT	0.20	1.19	3.15	2.48	2.30ab
CWP	0.27	1.36	2.24	2.36	1.97b
AKD	0.35	2.07	3.49	3.08	2.57ab
PMK	0.32	1.85	2.50	2.55	3.14ab
TLF	0.36	1.89	3.51	3.15	3.43a
RHW	0.32	1.86	2.49	3.39	2.83ab
CTL (WF)	0.27	1.81	2.36	2.08	2.29ab
CTL (UC)	0.37	1.84	2.93	2.80	2.32ab
	NS	NS	NS	NS	

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT
NS = Not significant

Table 6: Effect of cover crops treatment on emergence and days to fifty percent tasseling

Treatment	Emergence percent (%)	Days to 50% tasseling
MLN	96.4	56.3
WML	89.3	60.2
SPT	93.9	57.0
CWP	88.7	57.4
AKD	90.6	56.0
PMK	85.1	57.4
TLF	93.3	53.0
RHW	89.3	53.5
CTL (WF)	87.7	57.0
CTL (UC)	93.3	53.2
	NS	NS

NS = Not significant

Table 7: Effect of cover crops treatment on total weed count No/m^2 at harvest

Treatment	Broadleaf	Grasses	Total
MLN	24ab	10.7	34.7ab
WML	18bc	12.7	30.7ab
SPT	11.32cd	9.32	20.6abc
CWP	5.32d	17.32	22.64abc
AKD	5.32d	11.32	16.64abc
PMK	30.0a	10.00	40.0a
TLF	8.68cd	3.32	12.0bc
RHW	3.32d	10.68	14.0bc
CTL (WF)	4.00d	1.32	5.32c
CTL (UC)	13.0bcd	17.0	30.ab
		NS	

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT

Table 8: Effect of cover crops treatment on weed dry matter/m^2 at 12 WAP

Treatment	Broadleaf	Grasses	Total
MLN	42.8a	2.48c	45.28ab
WML	20.12abc	7.12c	27.24bc
SPT	15.64abc	4.4c	20.04bc
CWP	14.2abc	5.12c	19.32bc
AKD	2.88bc	9.68bc	12.56bc
PMK	7.32abc	20.4b	27.72bc
TLF	3.4bc	2.96c	6.36bc
RHW	1.52c	6.52c	8.04bc
CTL (WF)	1.0c	0.12c	1.12c
CTL (UC)	38.08ab	37.0a	75.12a

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT

Table 9: Effect of cover crops treatment on maize yield

Treatment	Cob yield (t/ha)	Grain yield (t/ha)	% Shelling
MLN	6.46	3.83ab	57.7ab
WML	6.50	4.83ab	74.4a
SPT	5.78	3.01b	51.6b
CWP	5.78	3.965ab	68.7ab
AKD	7.69	5.23a	67.4ab
PMK	6.94	4.06ab	57.7ab
TLF	6.02	4.06ab	68.2ab
RHW	5.77	3.85ab	68.3ab
CTL (WF)	6.16	4.3ab	69.0ab
CTL (UC)	6.02	4.01ab	66.7ab
	NS		

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT

Table 10: Effect of cover crops on number of cobs and leaf senescence

Treatment	Number of cobs/ha (x1000)	100 seed weight	Number of senescenced leaf/ha (x1000)
MLN	58.67	13.7	199.33
WML	53.33	13.4	207.99
SPT	53.33	12.04	218.67
CWP	53.33	12.73	257.07
AKD	58.67	13.29	283.73
PMK	58.67	13.16	214.39
TLF	53.33	14.66	212.79
RHW	58.67	13.50	239.99
CTL (WF)	53.33	13.67	294.93
CTL (UC)	53.33	13.74	298.66
	NS	NS	NS

NS = Not significant

Table 11: Percentage emergence, ground coverage and weed control rating

Treatment	% emergence	% G.C 5 WAP	% G.C 12 WAP	Weed control rating (%WC)
MLN	83.3ab	80a	0e	75a
WML	72.3bc	10c	0e	76.9a
SPT	75.0bc	53.3b	86.7a	80.3a
CWP	48.0d	46.7b	88.3a	89.5a
AKD	90.0a	56.7b	70b	84.5a
PMK	52.7d	12.7c	10d	51.7ab
TLF	65.0c	16.7c	23.3c	73.0a
RHW	-	-	-	83.9a
CTL (WF)	-	-	-	91.0a
CTL (UC)	-	-	-	18.4b

Means followed by the same letter(s) in a column are not significantly different at 5% level of probability using DMRT
GC = Ground Coverage

Table 12: The weed suppressing potentials of selected cover crops

Treatment	Relative GC at 5WAP	Relative GC at 12WAP	Relative Weed control at 12WAP	Relative Total weed count at 12WAP (no m^2)	Relative Total weed dry matter at harvest (gm^2)	Relative summation index	Overall rank
MLN	1.0	0.0	0.84	0.35	0.14	2.33	4
WML	0.8	0.0	0.86	0.39	0.23	2.28	5
SPT	0.67	0.98	0.89	0.58	0.32	2.47	2
CWP	0.58	1.0	1.0	0.53	0.33	2.44	3
AKD	0.71	0.79	0.94	0.72	0.51	2.88	1
PMK	0.16	0.88	0.58	0.3	0.23	1.27	7
TLF	0.21	0.25	0.82	1.0	1.0	2.03	6