GROWTH AND YIELD OF ONION *(Allium cepa* L.) AS INFLUENCED BY POULTRY MANURE AND WEEDING REGIMES IN SAMARU, ZARIA

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Abstract

Two field experiments were conducted at the Teaching and Research Farm of Institute of Agriculture, Ahmadu Bella University Zaria located on latitude ll'lT, longitude 7°38' and 686m above sea level during the 2010 and 2011 cropping seasons to study the effects of poultry manure and weeding regimes on the growth and yield of onion (Allium cepa L). The treatments consisted of four levels of poultry manure (0,5,10 and 151 ha$^{'1}$) and jour weeding regimes (Control, I, 2 and 3) laid out in randomised complete block design (RCBD) with three replications. The result of the trial showed a significant effect atP^{m} 0.05 of poultry manure and weeding regimes on growth and yield of onion. Highest growth and yield characters was realised with 151 ha$^{'1}$ of poultry manure and 3 weeding regimes. Similarly the control treatments of both factors (poultry manure and weeding regimes) significantly gave lower mean values of all parameters assessed throughout the period of observation. From this result, it could be concluded . that for optimum onion production in Samaru, Zaria a combination of 15 tha$^{'1}$ and 3 weeding regimes is considered to give better growth and yield of onion.

Key words: Poultry, manure, weeding regime, onion

INTRODUCTION

Onion *(Allium cepa* L.) belongs to the Alliaceae family and is one of the most important vegetables in the world, whose utility is ranked second after tomatoes (Brice *et at,* 1997). Onion can be grown on a wide range of climatic conditions, but does well in a medium climate without too much rain fall, excessive heat or cold (NIHORT,1986). The crop requires a well prepared land with an optimum soil pH within the range of 6.0 - 7.0, good tilt and has high moisture content. It is a photoperiodic sensitive crop, therefore its production is normally controlled by photoperiods and temperature. The sunshine hours vary from 10 -15 (Hussaini *et al.,* 2000). Onion is consumed in different ways by different people and forms an essential part of the traditional daily diet. It is a major spice item and ranks among top 5 vegetables in Nigeria (NIHORT, 1986). It can be eaten raw in salad, fried, boiled or roasted and also used in flavouring soups, canned food- products and other savoury dishes. It is used in every home virtually on daily basis (Hussaini *et al,* 2000). The bulb is used traditionally as a medicinal herb for the treatment of measles, pneumonia, cold and catarrh. Recent studies have confirmed that onion helps in fighting of osteoporosis or bone loss .Onion production is a viable industry that employs plenty of labour and the bulbs are traded in large quantities within and between countries of the world (Currah and Proctor, 1990). Despite the ranking of onion as the second most important vegetable in Nigeria, the present production levels do not meet the demand of the teeming populace. Limited changes in the production practices traditionally may be lagging behind the national demand (Denton and Ojeifo, 1990). Though the consumption of onion cuts across the country, where even in the north, production is restricted in f adama areas and grown mostly in the dry seasons under irrigation. Similarly the production level is below the optimum realised for other countries. For example, while it is 451 ha^{4} in India, it is 151 ha$^{'1}$ in Nigeria (FAO,2005).

Several factors are responsible for this discrepancy, ranging from improper agronomic practices, nursery practices, plant population, provision of good quality planting materials such as good seeds/ seedlings, weeding, irrigation, fertilizer application and control of pests/diseases using insecticides by our farmers (Yakubu *et al.,* 2006). Most fanners do not know the proper practices mentioned above in applying for optimum onion production thereby posing great limitations to onion and other crop outputs. Also lack of accurate knowledge on organic farming by our fanners make attainment of maximum productivity in onion and other crops in Nigeria a mirage. However, the use of inorganic fertilizer alone cannot guarantee sustainable yield of the crop. Hence, there is therefore the need for the inorganic sources to be complemented with organic ones

:;(Alasiri,2002).

^Therefore, this study was designed to investigate the effects of poultry manure and weeding regimes on the bulb yield of onion, with the view to identify the ideal combination for optimum onion production in Zaria.

MATERIALS AND METHODS

Field experiments were conducted during the 2010 *and* 2011 rainy seasons at the Teaching and Research Farm of Institute for Agriculture, Ahmadu Bello University Zaria located on latitude ifll'N, longitude7°38'E and 686m above sea level. The treatments consisted of four levels of poultry manure (0, 5, 10 andlS t ha"[1]) and four weeding regimes (0,2,4 and 6 WAS) laid out in a randomised complete block design (RCBD) with three replications. This gave a total of 48 plots each measuring $3m^1$ with 1m inter-row paths. The total area was $192m^2$. Seeds of Red Creole were obtained from Samara market in Zaria. Four nursery beds measuring 1m x 2.5m were marked and cleared, seeds were then planted using drilling method at a spacing of 15cm apart. Normal agronomic practices in the nursery site were carried out as and when due. At 6WAS, the seedlings were transplanted on 08* July, 2010 and 24th June, 2011 respectively. A three day supplementary irrigation interval was initially observed for a period of four weeks to guide against dry spell, there after extended to 7 days depending on the availability of rain fall for the crop till two weeks to harvest, supplementary irrigation was stopped completely. The poultry manure treatment was applied to the field a week before transplanting seedlings, while the first weeding was done two weeks after transplanting; the second weeding was also carried out 4 weeks after transplanting and lastly, the third one at 6 weeks after transplanting respectively. The growth and yield parameters were measured.

Data collected were subjected to statistical analysis of variance using Gen stat. Treatment means that were significantly different were compared using Duncans[1] multiple range test (DMRT) according to Gomez and Gomez (1984).

RESULTS AND DISCUSSION

Table 1 shows the effect of poultry manure and weeding regimes on the growth and yield of onion during 2010, 2011 cropping seasons in Samaru, Zaria but there was no significant difference on days to 50% flowering in both seasons. The results indicated that increasing poultry manure increased growth and yield of onion with the highest values at 15 t ha"[1]. This means that there is a higher tendency for higher onion characters with higher application of poultry manure. This result seems to agree with works of Akanbi *et al.*, 2010 who earlier reported that 5 t ha"[1] of animal dung annually will maintain growth and yield under continuous cropping. Similarly, Bababe *et al.* (1998) showed that organic manure is a supplier of N, P and K in the soil, which also increase the phosphate solubilisation of bacteria in the rhizosphere. Akoun (2004) also confirm that manure increases the nutrient status of the soil which leads to increases in growth attributes.

There were significant effects on weeding regimes on growth and yield of onion at P = 0.05, but there was no significant difference on days to 50% flowering (Table 1). The highest growth and yield of onion was obtained from 3 weeding regimes in both seasons. The lowest characters were obtained from the control treatment. These observations supports the earlier findings of Akobundu (1987 and 1989) that the 4* week after transplanting is actually the period of critical weed competition. Reamarkers (2001), Kadams and Amans (1990), Currah and Proctor (1990) all attested to this fact.

Table 1: Growth and Yield of Onion as Influenced by Poultry Manure and Weeding Regimes at Zaria in 2010 and 2011

Treatments	Plant height (cm)	Number of leaves per plant		Number of Tillers per plant		Days to 50% flowering		Number of flowers per plant		Bulb yield per plot (kg)		Bulb yield per ha^{-1} (kg)	
		2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Poultry Manure (t) ha^{-1}													
0	34.64d	34.78d	4.54d	3.68d	1.78b	1.65b	50.24a	51.65a	4.40d	3.68d	1.78d	1.67d	3.25c	3.10c
5	37.23c	36.87c	5.65c	4.76c	2.15b	2.08b	51.44a	52.91a	6.23c	5.83c	2.45b	2.20b	4.14b	4.1 Ib
10	40.38b	39.75b	7.43b	6.87b	234b	2.25b	5232a	53.21a	8.20b	7-65b	2.64b	2.45b	'5.22a	5.08a
15	43.67a	44.38a	9.45a	8.76	4.25a	3.92a	53.27a	52.15a	11.15al	0.47a	4.35a	3.97a	5.20a	5.15a
Weeding Regimes														
Control	36.35d	35.64d	5.16d	4.27d	2.01d	1.98d	50.88a	52.65a	^ 345d	334d	2.81d	2,68d	S.llb	3.09b
1	38.46c	37.38c	7.27c	6.88c	3.73c	336c	52.12a	51.78a	5.24i	l.48c	3.75bc	3.66bc	3.47b	3.46b
2	41.65b	4033.b	9.15b	8.89b	536b	4.80b	51.24a	51.68a	S^bli	L74b	5.46b	4.40b	5.24a	5.18a
3	44.29a	43.32a	10.76a	9.46a	8.67a	7f89aC	52J6a	50.64a	10.20a	9.12a	7.87a	7.64a	5.26a	5.14a
Interactions P x W	*	*	*	*	*	*	NS	NS	•	*			*	•*

Means with the same letter (s) within a column are not significantly different at P = 0.05 DuncanV Multiple Range Test (DMRT). NS = Not significant at 5% level of significance * = Significant at 5% level of significance

CONCLUSION

The results of this trial showed that applications of poultry manure not lower than 151 ha ^{J} is needed for higher onion growth and yield. SWeeding regime on the other hand is more appropriate for higher growth a'nd yield of onion. Since higher onion yield was obtained from higher poultry manure level of 15 t ha$'^{1}$ and higher 3weeding regime, the^e could be higher response with higher levels of both treatments. Therefore, there is the need to coriduct similar trials in this area and other places with higher levels of treatments incorporated.

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