Journal of Agriculture and Veterinary Sciences
Volume 7, Number 2, 2015
ISSN: 2277-0062

Effect of Different Levels of Organic Manure (Poultry droppings) on the Growth and Yield of Benniseed: *Sesamum indicum* var. Mashesherenkaka as Produced in Bauchi State College of Agriculture, Yelwa, Bauchi

Nanyi J.I. Dutse, Abarshi Titus, Musa Yusuf and Usman Sa'adu

College of Agriculture Yelwa, Bauchi State
Email: nanyijd@gmail.com

ABSTRACT

Sesame (*Sesamum indicum* L.) belongs to the plant division Spermatophyta, subdivision Angiospermae, genus *Sesamum* with about 36 species, commonly referred to as benniseed in English in Nigeria. Nigeria is endowed with favorable ecologies for sesame cultivation. However low yield potential of the crop coupled with problems encountered during its establishment and harvesting tend to discourage growers. Considering its economic importance, it is anticipated that high yielding varieties could attract more farmers to its production. Scarcity and the expensive nature of inorganic fertilizer coupled with its potential negative impact on environment have led to the increase use of organic manure in crop production. Poultry droppings as an organic manure rich in nitrogen, phosphorus and potassium has been found to have positive impact on the growth and yield of sesame crop. This therefore triggered the desire for further investigation on the effect of different levels of organic manure (poultry droppings) on the growth and yield of a potentially high yielding, white seeded sesame var. mashesherenkaka. With the view to releasing the findings from these investigations to interested sesame producers in the study area to help guide them to the use of the optimum level of organic manure for high yield and better economic return. Two separate experiments were conducted in the research farm of Bauchi State College of agriculture, Yelwa, Bauchi, Bauchi State, Nigeria. The treatments were four levels of organic manure (poultry droppings); which were 0(control), 15, 20, 25 tonnes/ha. The experimental design used was Randomized Complete. The plot size was 2 x 2 m= 4m$^{2.}$The various levels of organic manure were randomly applied to well demarcated plots at two weeks before seed sowing in each cropping season. Data collected and analysed using the SPSS analytical tool for the research periods were; plant height (cm) leaf area (cm2), number of branches, and capsules per

plant, 1000 seed weight (g) and seed yield (Kg/ha). All through the period of the investigation it was observed that organic manure significantly (p=0.05) affected all parameters studied except number of branches per plant during 2013 study period which was statistically non significant. Highest seed yield was observed in crops treated to 25tones/ha of poultry droppings, though the yield obtained in 2013 was almost doubled the value obtained in 2012. This could be associated to inconsistency in weather factors especially rainfall and wind speed at the time the crops are fully grown. It would be more appropriate for further studies to be made on the topic before arriving at a conclusive and reliable recommendation of an acceptable value of poultry droppings for effective production of sesame var. mashehserenkaka in the study are.

Keywords: Benniseed, Organic Manure, Poultry Droppings, Var. Mashesherenkaka, White Seeded.

Introduction

Sesame (*Sesamum indicum* L.) belongs to the plant division Spermatophta, subdivision Angiospermate, class Dicotyledonae, order Turbiflorae, family Pedialiaceae, genus *Sesamum* with 36 species of which *Sesamum indicum* is the most commonly recognized. In Nigerian languages it is commonly referred to as benniseed in English, "ridi" in Hausa , "Ishawa" in Tiv, "Yamati" or "Eeku" in Yoruba,"Igorigo" Igbira and "Doo" in Jukun to mention but few (Salako and Falusi, 2004). The crop is cultivated in almost all tropical and subtropical Asian and African countries in the southern European countries, Russia, South and Central America to some extent in the United States, China, India, México and Sudan are leading world producers. Nigeria, Ethiopia and Sudan account for a major part of world trade on the commodity (Iwo and Idowu, 2002). Nigeria is endowed with favorable ecologies for sesame cultivation; it is popular in many parts of Central, North, Western and North Eastern zones where it is usually grown. However low yield potential of the crop coupled with problems encountered during its establishment and harvesting have tend to discourage growers. Thus leading to a decline in the total land devoted to its cultivation. (Salako and Falusi, 2004). Considering its economic importance it is anticipated that varieties which are more productive can be developed. Farmers prefer white seeded sesame to other types; they believe that it is more productive, more useful with higher oil content. To avert food shortages and eventual famine there is a need to pay more attention to our food and cash crops (Salako and Falusi, 2004). Sesame will require about 67.23 kg/ha of nitrogen, while the

application of phosphorus and potash should be according to soil test. High phosphorus levels in saline soils may decrease sesame yield. (Johnson and Crissant, 2004). Nitrogen fertilizer has also been reported to have profound effect on oil seed crops application of about 45 kg/ha N increased the number of branches and capsules per plant, while in another instance it was observed with increase in the application of 120 kg/ha N maximum seed yield was obtained with the application of 60 kg/ha N, tallest plant, highest number of capsules per plant and highest seed yield were also obtained with the application of 45kg/ha N (Asghar *et. al.*, 2003) Sesame's nitrogen requirement can be fulfilled through organic sources, such as leguminous cover crops or animal manure(Thomas, 2011). The scarcity and expensive nature of inorganic fertilizers coupled with its negative effects on environment has led to increased use of organic manure in crop production. Consequently organic farming has been advocated and farmers are being advised to reduce the use of chemical fertilizers to reduce its potential hazards to environment. Organic manure apart from releasing nutrient to the crops also improves the structure of the soil. Poultry manure has been recognized and used as manure in crop production and its analysis has shown that it's high nitrogen, phosphorus, potassium and some other nutrient elements. Excessive application of these nutrients could lead to water pollution and soil toxicity (Ogbonna and Umar-Shaaba, 2011).

Addition of organic manure which can supply nutrient requirement of crops with released nutrient in a gradual and controlled way allows greater production with minor environmental impact (Khaled *et al,* 2012).Excessive use of agro-chemicals increase pollution, decrease soil productivity and leads to nutrient imbalance. Integrated use of organic and inorganic fertilizers in a balanced proportion for sustainable production of sesame was emphasized by USDA.(1980) in Duhoon, (2006).Organically produced sesame is preferred and given premium in the global market, Duhoon, (2006). Sesame is susceptible to pests and diseases which are of economic importance. Uses of fungicides such as benelate, dithane are recommended for *Cercopora* leaf spot control. Expected yields could be 80 to 120 kg/ha, 239 to 450 kg/ha or 239 to 1000 kg/ha (Iwo and Idowu, 2002). Processed oil gives added value to the crop promotional activities in the use of sesame for confectionaries and preparation of infant weaning food livestock feed and fertilizer have been demonstrated. The quest to realizing potentially high yielding crop varieties through the use of more affordable and easily obtainable less expensive plant nutrient such as organic manure, especially poultry droppings, which has been discovered to contain high level of nitrogen, phosphorus potassium and other nutrients has helped in no small way to reduce the cost of production in many tropical crops. This therefore necessitates the

dare need for further investigation on the effects of different levels of organic manure (poultry droppings) on both the vegetative, yield and yield related factors of the under studied sesame variety in the study area. Especially within the period that farmers in the study area are being encouraged to adopting the said variety for commercial production. Any meaningful results obtained from this research would certainly be of good benefit to these sesame commercial producers.

Materials and Methods

Two separate experiments were conducted in the research farm of Bauchi state college of Agriculture, Yelwa Bauchi during the 2012 and 2013 rainy season. Bauchi is located on longitude 10° 17′ N and latitude 90° 49′ E on an elevation of 609.3m above sea level. Bauchi is located in the northern guinea savanna agro-ecological zone of Nigeria .The experimental site was in each case cleared of previous farm debris manually using small hoe, they collected and burnt. Materials used were, small hoe, ranging poles, gutters chain, pegs, labeled placards, poultry droppings and sesame seeds. The plot was ploughed, harrowed manually using the small hoes implement. The land was demarcated into main plots of 2x2 m=m^2 with a passage of 0.5m between the main plots that could facilitate farm operations. Pegs with labeled cards were used to indicate the different treatments. The treatments were o, 15, 20 and 25 tons/ha; which were reduced appropriately to the size of the plots. The poultry droppings were measured and randomly applied to their appropriate plots two weeks before seed sowing. The seeds were weighed to the weight of 2g/4m^2, they weighed seeds were treated with an appropriate insecticide perimethrin 0.60% (pit paff) so as to help kill any insect that might come picking the seeds after planting. The treated seeds were sown on 12th July 2012 and 9th July 2013 respectively.

The treated seeds were mixed with fine clean sand in the ratio of 1 to 3, and then it was dibbled at the spacing of 20 x 30 m., there were cases of resupply in beds with poor germination cases. Two weeding were conducted, the first weeding which were at two and four weeks after emergence. Thinning of over populated beds was carried out at three weeks after emergence. The common pests encountered in the course of the research were black ants which threaten the young sesame seedlings and were often controlled using the same pit paff powdered insecticide. There were instances of fungal diseases in the 2012 research period which scantly affected some plants; but were controlled by roughing the infected plants and burning them aside when dried so as to stop further spread of the diseases. Data collected and analyzed in the course of the two years research were Leaf area, plant height, and number of leaves per

plant, number of branches per plant, number of pods or capsules per plant, 1000 seed weight and seed yield (kg/ha). Also noted were number of days to first flowering, number of days to first fruiting, number of seeds per pod and number of days to maturity; all per treatment. Mean values of all the data collected were subjected to analysis of variance using the SPss statistical tool of analysis, the results obtained and analyzed are presented and discussed in the tables following

Results

2012 Results

Table 1

Effect of different levels of Organic manure (poultry droppings) on sesame leaf area(cm^2)

Treatments Levels of organic manure,(tones/ha).	Weeks after planting. 4	6	8	10
0	11.4	23.11	30.46	42.5
15	18.44	45.23	56.1	65.83
20	21.47	51.99	66.31	76.02
25	23.97	48.01	58.11	58.09
SE±				
Levels of significance	**	*	**	**

Table 2

Effect of different levels of Organic manure (poultry droppings) on sesame plant height (cm)

Treatments Levels of organic manure, (tones/ha).	Weeks after planting. 4	6	8	10
0	13.35	25.48	36.26	46.21
15	20.95	46.44	50.59	65.02
20	19.86	41.39	52.02	67.99
25	21.64	47.94	56.52	79.01
SE±				
Levels of significance	**	**	**	**

Table 3

Effect of different levels of Organic manure (poultry droppings) on

Sesame number of branches and number of capsules per plant as observed at 12 WAP.

Treatments	Weeks after planting.	
Levels of organic manure, (tones/ha).	Number of branches per plant	Number of capsules per [plant
0	1	38.20
15	2	73.00
20	3	87.00
25	3	89.60
SE±		
Levels of significance	**	**

Table 4

Effect of different levels of Organic manure (poultry droppings)

on sesame 1000 seed weight and grain yield (kg/ha).

Treatments Levels of organic manure, (tones/ha).	1000 seed weight(g) (g	Grain yield (kg/ha.)
0	1.81	236.6
15	2.79	946.2
20	3.00	965.8
25	3.01	973.6
SE±		
Levels of significance	**	**

2013 Results

Table 1

Effect of different levels of Organic manure (poultry droppings) on sesame leaf area(cm2)

Treatments	Weeks after planting.			
levels of organic manure.	2	4	6	8
tones/ha.				
0	10.06	34.05	45.28	42.54
15	11.28	35.74	47.78	44.56
20	13.03	37.81	61.81	64.17
25	13.3	38.5	64.8	67.3
SE±				
Levels of significance	**	*	**	*

Table 2

Effect of different levels of Organic manure (poultry droppings) on sesame plant height (cm)

Treatments	Weeks after planting.				
Levels of organic manure, (tones/ha).	2	4	6	8	10
0	13.32	31.82	78.95	102.28	98.9
15	14.54	42.56	83.43	106.16	104.32
20	15.54	42.92	86.49	109.29	106.92
25	15.8	43.83	94.08	111.48	112.05
SE±	0.648				
Levels of significance	NS	**	**	**	**

Table 3

Effect of different levels of Organic manure (poultry droppings) on sesame number of leaves per plant

Treatments	Weeks after planting.			
Levels of organic manure, (tones/ha.)	2	4	6	8
0	12.5	23.01	39.02	40.75
15	14.5	24.25	46.75	45.75
20	14.01	26.5	48.75	50.5
25	15	26.03	45.25	50.56
SE±				
Levels of significance	**	**	**	**

Table 4

Effect of different levels of Organic manure (poultry droppings)

on sesame number of branches per plant

Treatments	Weeks after planting.		
Levels of organic manure, (tones/ha).	6	8	10
0	3	3	3.25
15	2.25	3	3.5
20	3	4	4
25	3	4	4
SE±	0.363	4.01	0.393
Levels of significance	NS	NS	NS

Table 5

Effect of different levels of Organic manure (poultry droppings)

on sesame number of flowers per plant

Treatments	Weeks after planting.		
Levels of organic manure,(tones/ha).	6	8	10
0	11.25	22.50	10.25

15	12.00	26.75	10.50
20	14.00	34.25	11.75
25	16.25	38.00	12.00
SE±			0.975
Levels of significance	**	**	NS

Table 6

Effect of different levels of Organic manure (poultry droppings) on sesame number of capsules per plant

Treatments	Weeks after planting.	
Levels of organic manure,(kg/ha).	8	10
0	27.25	33.50
15	13.00	30.25
20	32.75	41.00
25	34.00	44.51
SE±		23.05
Levels of significance	**	NS

Table 7

Effect of different levels of Organic manure (poultry droppings) On sesame grain yield (kg/ha).

Treatments	
Levels of organic manure,(tones/ha).	Grain Yield kg/ha.
0	5493.02
15	6254.04
20	10861.03
25	18025.01
SE±	
Levels of significance	**

The results obtained and analyzed on the 2012 rainy season experiment all through the period of the investigation clearly showed that organic manure (poultry droppings) had high statistical significant effect(P±0.05) on both sesame (var. mashesherenkaka) growth, yield and yield related parameters. Similarly the observations made during the 2013 investigation period, showed that organic manure had significant effect(P±0.05) on all growth parameters, except for the effect of organic manure (poultry droppings) on sesame number of branches per plant which was all through the period of the study statistically non significant. Similarly the effect of organic manure (poultry droppings) was observed to be statistically non significant on some of its yield parameters such as; sesame number of flowers and sesame number of capsules per plant at 10 weeks after planting.

Discussions

Results obtained, analyzed and presented all through the period of investigation as per sesame growth parameters as observed through the two years study clearly indicated that organic manure (poultry droppings) at different levels as applied to sesame var. *mashesherenkaka* a local variety responded positively. With significant (P± 0.05) increase in leaf area(cm^2) as the level of organic manure increases at 4 weeks after planting , increasing with increase in fertilizer level from 0 to 20 (tonnes/ha), then decline with further increase in fertilizer level to 25(tones/ha) at 6,8 and 10 weeks after planting. Suggesting that farmers could best apply 20 (tonnes/ha) of organic manure (poultry droppings) to their sesame var. mashesherenkaka in the study area for optimum leaf area development. Highest mean value sesame leaf area was (76.02) as observed at 10 weeks after planting. On the other hand observations made on effect of different levels organic manure, on sesame plant height (cm) though significantly different (P± 0.05) all through the period of the study, showed different pattern, with 25 (tonnes /ha) fertilizer level giving significantly (P± 0.05) highest plant height (cm) all through the period of the study from 4 to 10 weeks after planting, whose values were 21.64, 47.94, 56.52 and 79.01 cm respectively. This progressive increase in height might have been possible following the increase in nutrient availability to the plant as the organic manure continues to decompose with increase in rainfall and temperature as the rainy season advances, typically characteristic of the study area which as stated above is located in the tropics. The result obtained was similar to that observed and reported by Ogbonna and Umar-Shaba (2011), that organic manure releases nutrient to the crops through the improvement of soil structure. Significantly(P± 0.05) highest number of capsules per plant and seed yield in the 2012 cropping season showed highest values of this yield and yield related character coming from the application of 25 (tonnes /ha) of organic manure. This could be a direct interpretation of the organic manure on sesame growth factors earlier on reported to yield and yield related factors. Since crop yield has direct link to the vegetative performance of any crop plant. Similar trend was observed in the 2013 cropping season study of which the effect of different levels of organic manure on sesame var. mashesherenkaka showed 25 (tonnes/ha) giving significantly highest leaf area (cm^2),plant height (cm) and highest number of leaves per plant, all through the period of the investigation. This effect subsequently showed up on sesame number of flowers per plant at 6 and 8 weeks after planting, number of capsules at 8 weeks after planting and sesame grain yield, with significantly highest grain yield with the application of 25 (tonnes /ha) of organic manure (poultry droppings) giving a grain yield of 18.025 tonnes /ha .This value obtained almost doubled the value obtained in the

2012 cropping season. This obvious difference could be linked to slightly earlier sowing date for the 2013 crops than the one of 2012. In addition to this, could be the inconsistent nature of rainfall being received in the study area coupled with increase in temperature due to global warming phenomenon which generally leads to violent short duration rainfall characterized by violent thunderstorms and wind which caused heavy lodging to tall growing crops as was experienced in the 2012 cropping season. Much of these crops that lodged were prematurely harvested so as to prevent rotting of lodged crops since the rain continued into the cropping season in the study the area as earlier reported. Significant effect of organic manure (poultry droppings) on sesame var. mashesherenkaka growth, yield and yield related characteristics obtained above also conferred with findings of Asghar *et al.*, (2003) who reported significant effect of organic manure on the growth and yield of sesame varieties, though in a different location. With the above findings it is expedient that sesame var. mashesherenkaka a promising high yielding variety could be cultivated by sesame commercial producers in the study area with the application of organic manure (poultry droppings); provided the organic manure is applied and worked into the soil at an earlier date before seed sowing. And the seeds should be sown as soon as the rain establishes to allow for good crop establishment, growth, development and subsequently good and viable seed yield. For certainty of the value of organic manure to be used in the study area it is suggested that more investigation be made so as to ascertain the optimum value for better yield and higher economic return.

References

Asgar, M.M., Farrukh, S., Mumtaz, A.C. and Shamim, A. (2003) Influence of Different Nitrogen Levels on Productivity of Sesame *(Sesamum indicum* L.) under Varying Planting Patterns. *International Journal of Agriculture and Biology* **5**(4):490-492

Duhoon, S.S., Jyotishi A., Deshmukh M.R. and Singh N.M. (2006) Optimization of Sesame (*Sesamum indicum* L.) Production through Bio / Natural Inputs. http//www.croscience.org.au.icsc2004/poster/2/5/1900_duhoonss.htm?print=1 Pp1 of 5

Iwo, G.A. and Idowu A.A. (2002) Impact of Research and Development on Sesame toward Poverty Alleviation in Nigeria. *NOMA* **1**:15-21

Khaled, A., Shaban, Mona, G., Abd EL-Kader and Zeinab, M. Khalil (2012). Effect of Soil Amendment on Soil Fertility and Sesame Crop Productivity under Newly Reclaimed Soil Conditions. Soil, Water and Environmental Research

Institute Agricultural Research Centre Giza, Egypt. Journal of Applied Sciences Research, 8(3):1568-1575 ISSN 1819-544X

Salako, E.A. and Falusi O.A. (2004) Plant Genetic Resources Newsletter <b> Assemlage of Sesame Germplasm for Coser…/b *http//www.ipgri.cgiar.org/pgrnews/ette//article.asp?id_article==23&id_Issue*—127 Pp 1 of 3

Thomas Jefferson (2011) Sesame A High Value Oilseed. Overview. Home Crops Publications News Educational Farm Thomas Jefferson Agricultural Institute. 601 West Nifong Blvd. Sulto Columbia, Mo 65203573-449-3518 Info@jeffersoninstitute.org

Ogbonna, P.E. and Umar-Shaaba, Y.G. (2011) Yield Responses of Sesame (*Sesamum indicum* L) to Rates of Poultry Manure Application and Time of Planting in a Derived Savannah Ecology of South Eastern Nigeria. Department of Crop Science, University of Nigeria, Nsukka, Enugu State, 410001, Nigeria. African Journal of biotechnology Vol.10 (66), pp14881-14887 http://www.academicjournals.org/AJB DOI:10.5897/AJB11.1989 ISSN 1684-5315@2011 *Academics Journals.*

References to this paper should be made as follows: Nanyi J.I. Dutse, et al., (2015), Effect of Different Levels of Organic Manure (Poultry droppings) on the Growth and Yield of Benniseed: *Sesamum indicum* var. Mashesherenkaka as Produced in Bauchi State College of Agriculture, Yelwa, Bauchi. *J. of Agriculture and Veterinary Sciences,* Vol. 7, No. 2, Pp. 72– 82.