

Organic fertilizers improve the growth, seed quality and yield of newly released soybean (*Glycine max* (L.) Merrill varieties in the tropics

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# OUTLINE

A: INTRODUCTION

B: JUSTIFICATION

C: MATERIALS AND METHODS

D: RESULTS & DISCUSSION

E: CONCLUSIONS

## A: INTRODUCTION

- Soybean (*Glycine max* (L.) Merrill) seed contains 18 – 25% oil and 30 – 50% protein required for human and animal nutrition.
- Average seed yield of soybean in Africa is below 1 t/ha as against the world average of 2.7t/ha
- Low yields can be attributed to low soil fertility status, weed infestation, rising cost of agrochemicals, low purchasing power of resource-constrained farmers, lack of improved crop varieties, lack of access to necessary inputs, poor management practices among others

## OBJECTIVE OF STUDY

**To evaluate the effect of organic fertilizer application on growth, yield, yield attributes and quality of soybeans in the tropics.**

## B: JUSTIFICATION

- According to Chen (2006), all the required nutrients by plant must be present in the soil in balanced quantities and forms for the plant's optimal growth.
- Organic soil amendments have been reported to improve the physical and chemical, and biological properties of the soil through the improvement of soil aeration, soil carbon exchange capacity (CEC), water holding capacity, slow mineralization of organic materials (Yan et al. 2007; Zhong et al. 2010; Gautam and Pathak, 2014).
- Unfortunately, fewer efforts have been made thus far to explore the potential of the use of only organic fertilizers to boost the productivity of soybeans in the tropics.

# MATERIALS AND METHODS

- Location: Organic research plots of IFSERAR (Nigeria) 7° 23' N, 3° 39' E, altitude 139 m above sea level) during the late cropping seasons of 2015 and 2016 on a sandy loam soil.
- Design was RCBD in a 5 × 4 factorial arrangement and replicated three times.
- A: Varieties:
  - TGx 1448-2E (late maturing)
  - TGx 1440-1E (Late maturing)
  - TGx 1740-2F (Early maturing)
  - TGx 1987-62F (Early maturing)
  - TGx 1835-10E (Early maturing)
- B: organic fertilizers:
  - a. Aleshinloye Grade B (0.58 and 0.56% N; abattoir waste based)
  - b. Organo farm (1.58 and 1.67% N; brewery waste based)
  - c. Gateway (0.50 and 0.50% N; animal dung and wood ash based)

## MATERIALS AND METHODS CONTD.

- Data collection(on five tagged plants)
  - a. Plant height at physiological maturity (R7)
  - b. Grain filling period (GFP)
  - c. Above ground plant weight.
  - d. Number of branches per plant
  - e. Number and weight of seeds per plant
  - f. Number of pods per plant
  - g. Grain yield per ha.
  - h. Seed quality (Oil and protein content, %)

# **RESULTS AND DISCUSSION**





• **Table 2: Effect of organic fertilizer application on some yield attributes of soybeans, 2015 and 2016**

Treatment	2015				2016			
	PODN	PODW (g)	NSD	WTSD (g)	PODN	PODW (g)	NSD	WTSD (g)
<b>Variety (V)</b>								
TGx 144-2E	53.1	19.0	83.1	9.9	59.2	23.8	92.9	11.4
TGx 1440-2E	5.7	25.0	85.0	13.2	55.2	24.5	83.4	10.9
TGx 1740-2F	59.6	19.8	97.4	10.8	49.9	17.5	83.3	9.9
TGx 1987-62F	36.4	13.2	76.4	9.4	33.1	11.5	76.9	8.2
TGx 1835-10E	20.4	8.1	44.0	8.6	20.3	8.9	43.9	9.3
LSD (5%)	17.43	8.19	ns	ns	15.99	8.76	ns	ns
<b>Organic fertilizer (F)</b>								
Control	33.8	10.4	61.8	6.5	31.2	12.6	59.2	7.3
Aleshiloye B	61.4	21.6	90.8	16.2	58.3	20.3	89.9	14.4
Organo Farm	47.9	21.7	92.9	10.6	44.1	21.3	89.8	9.3
Gateway	45.1	14.4	63.8	8.3	40.1	14.7	65.4	8.8
LSD (5%)	15.59	7.33	ns	4.03	14.30	ns	ns	4.30
V × F	ns	ns	ns	ns	ns	ns	ns	ns

• ns – not significant, PODN – number of pods per plant, PODW - weight of pods per plant, NSD – number of seeds per plant, WTSD – weight of seeds per plant

Table 3: Effect of organic fertilizer application on seed yield and quality of soybean varieties, 2015 and 2016

Treatment	2015			2016		
	Seed yield (kg/ha)	Protein content (%)	Oil content (%)	Seed yield (kg/ha)	Protein content (%)	Oil content (%)
<b>Variety (V)</b>						
TGx 144-2E	1518.2	36.1	16.4	1833.3	35.5	16.9
TGx 1440-2E	1824.8	36.1	17.4	1805.6	36.4	17.4
TGx 1740-2F	1792.9	37.0	17.1	1715.3	36.1	17.3
TGx 1987-62F	1015.3	36.8	17.4	1638.9	37.3	17.4
TGx 1835-10E	547.3	37.2	17.4	1131.9	35.3	16.9
LSD (5%)	314.89	0.24	0.03	365.08	0.22	0.32
<b>Organic fertilizer (F)</b>						
Control	997.9	35.1	16.5	1444.5	35.9	16.9
Aleshiloye B	1595.7	36.9	17.6	1577.8	36.2	17.3
Organo Farm	1446.6	37.2	17.0	1794.4	36.6	17.1
Gateway	1318.7	37.4	17.6	1683.3	37.8	17.4
LSD (5%)	281.65	0.22	0.02	ns	0.19	0.28
V × F	**	**	**	ns	**	**

ns – not significant, \*\* significant at 1% probability level

## E: CONCLUSIONS AND RECOMMENDATIONS

- **On average, the three fertilizers enhanced seed quality of soybeans relative to the control.**
- **It was concluded that application of organic fertilizers to soybeans is a worthwhile venture that can boost its production in the tropics.**

- **THANK YOU VERY MUCH**