

**EFFECT OF POULTRY AND
GREEN MANURE SOURCES ON
THE PRODUCTIVITY OF
POPCORN (*Zea mays* L. var. *everta*)**

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- Limitation of food production in many parts of Africa (Cassman, 1999, Pablo and Ken, 2013).
 - Nutrient deficiency could be largely attributed to the decreased soil organic matter
 - The decline in crop production has resulted in food insecurity manifested as starvation and malnutrition).
 - To increase crop production, farmers adopt intensive agriculture using mineral fertilizers
 - Solution: adoption of strategies for better soil management such as the use of manures as nutrient sources

Materials and Methods

- Experimental site: IAR, Samaru (11°11'N, 07°38'E and 686m above sea level) during the 2013 and 2014 rainy seasons
- Treatments : Four poultry manure rates (0, 2, 4 and 6tha⁻¹) and green manure from two cowpea varieties (SAMPEA 6 and Kananado).
- Cowpea clipping : 5cm at six weeks

Objectives

- To improve the nutrient status of the soil
- To determine the effect of poultry and green manure on the productivity of popcorn

Table 1: Mean nutrient composition of the cowpea varieties incorporated as green manure at Samaru during the years of experiment

Treatments	Percentage (%)				<u>Mg kg⁻¹</u>		
	N	P	K	OC	Calcium	Magnesium	C: N
SAMPEA 6							
0tha ⁻¹ Pm	1.40	0.370	1.53	44.89	2111.10	6734.50	32.06
2 tha ⁻¹ Pm	2.10	0.455	2.50	33.58	1979.10	7808.44	15.99
4 tha ⁻¹ Pm	4.73	0.436	1.96	42.46	2106.30	4789.55	8.98
6 tha ⁻¹ Pm	3.71	0.394	1.42	37.11	1784.50	6347.42	10.00
Kananado							
0tha ⁻¹ Pm	4.10	0.443	1.71	52.34	2165.40	3846.33	12.77
2 tha ⁻¹ Pm	4.87	0.374	1.56	47.52	1987.30	4983.72	9.760
4 tha ⁻¹ Pm	2.63	0.483	1.28	45.88	2066.62	13572.21	17.44
6 tha ⁻¹ Pm	1.75	0.284	1.18	55.20	2022.60	1368.46	31.54

Pm = Poultry manure, OC = Organic carbon

Table 2: N, P and K contents of poultry manure used during the experiment in 2013 and 2014 rainy seasons

Nutrients	2013	2014
Total N (%)	1.70	1.74
Available P (mgkg ⁻¹)	1.59	1.32
Available K (Meq/100g)	0.63	0.89

Poultry manure analyzed at the analytical laboratory, Department of Agronomy, Ahmadu Bello University, Zaria.

Table 3: Effect of poultry manure and green manure sources on the shoot dry weight of popcorn at Samaru during 2013 and 2014 rainy season

Poultry manure (tha ⁻¹)	2013		2014	
	SAMPEA 6	Kananado	SAMPEA 6	Kananado
0	131.7b	108.9c	81.7b	92.8b
2	136.8b	128.4bc	102.3ab	92.9b
4	169.3ab	178.0a	104.7a	104.0a
6	191.9a	188.1a	128.0a	108.4a
	SE± 15.67		SE± 9.68	

Means followed by the same letter(s) within a treatment group are not significantly different at 0.05 level of probability using DMRT.

Table 4: Effect of poultry manure and green manure sources on the yield of popcorn at Samaru during 2013 and 2014 rainy season

Poultry manure (tha ⁻¹)	2013		2014	
	SAMPEA 6	Kananado	SAMPEA 6	Kananado
0	1077c	1325bc	1605c	1941b
2	1668ab	1827a	2307a	2257a
4	1916a	1889a	2390a	2298a
6	1899a	1971a	2335a	2398a
	SE± 124.12		SE± 109.19	

Means followed by the same letter(s) within a treatment group are not significantly different at 0.05 level of probability using DMRT

Discussion

- Increases due to the incorporation poultry manure
 - N, P and K supply: low rates of N (0.063%), P (3.5) and organic carbon (0.5) but in the second year there was a boost to 0.15%, 6.85 and 1.25 for N, P and OC respectively.
 - Increased SOC resulted in release of nutrients for plant growth as well as promote the structure, biological and physical health of the soil.
 - OM :serve as a store house for nutrients, improves nutrient recycling, soil structure, infiltration, water holding capacity and energy source for micro organisms (Perrings, 1999).
 - Poultry manure helps in soil (Agbede *et al.*, 2013, 2014, 2017, Atankora *et al.*, 2014, Warren *et al.*, 2006).

- C: N ratio of SAMPEA 6 foliage decreased with increase in poultry manure rates and that indicated a higher rate of decomposition of the foliage and as mineralization takes place the nutrient status of the soil is improved.

Conclusion

High popcorn yields can therefore be obtained by using 2 t ha⁻¹ of poultry manure and green manure from either of the cowpea varieties.

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