

Effect of Sokoto Phosphate Rock on the Growth and Yield of Bambara Groundnut in Sudan Savanna of Nigeria.



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INTRODUCTION & AIM

- Bambara groundnut [*Vigna subterranea* (L.) Verdc.] is a rich source of protein and good supplement to cereal-based diets. also known as Bambara nut (National Research Council. 2006), Bambara bean (FAO, 2024), Congo goober (USDA, 2024), earth pea (FAO, 2024), ground-bean or hog-peanut (USDA, 2024). Its name originates from West Africa and is from the Bambara tribe in Mali (WhatIF Foods, 2024). The haulm is used as livestock feed in most of the drier parts of Africa. It leaves, rich in P, are used for livestock feed (Yao Djè *et al.*,2005). Seeds are given to pigs and poultry while leafy stems are used as livestock fodder (Brink *et al.*,2006). Bambara groundnut has been reported to fix up to 28.42 kg Nha⁻¹ in the Sudan-Sahelian zone of Nigeria (Yakubu *et al.*, 2010). This legume is used in crop rotations to improve soil productivity through its ability to fix atmospheric nitrogen and provide it to the soil (Anikwe, 2003). The juice extracted from the leaf is applied to the eyes to treat epilepsy and the roots are sometimes used as an aphrodisiac (Brink *et al.*,2006). Phosphate rocks contain 27–41% P₂O₅, which is slowly available to plants but persists in the soil for many years (El Bamiki *et al.*,2021).
- The experiment was carried out to study the influence of Sokoto phosphate rock applications on the Growth and yield of the Bambara groundnut crop in the study area.



METHOD

- Experimental site:** Dryland Teaching and Research Farm of Usmanu Danfodiyo University, Sokoto, Nigeria.
- Treatments:** The treatments consisted of five levels of Sokoto phosphate rock (0, 20, 40, 60 and 80 kg P₂O₅ ha⁻¹).

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- Experimental design:** Study field was laid in three (3) blocks and each block consists of 15 plots. Each measuring 2m x 2m (4m²) and was demarcated and ridged at 50 cm inter-row spacing and 0.5m path between adjoining plots and 1m distance between the adjoining Blocks. All cultural practices were observed as per crop requirement.
- Data collection and analysis:** Data were collected on plant height, number of leaves, leaf area, leaf area index, day to 50% flowering, day to 50% maturity, number of pods per plant, total dry weight, pod yield (g), shell weight, shelling percentage, haulm weight, stover weight, harvest index (%), 100-grain weight, grain yield. The data collected were analyzed using Duncan's multiple range test (DMRT) and mean separation was carried out.

RESULTS & DISCUSSION

Table 1: Plant height, Number of leaves, Leaf area, Leaf area index, 100-grain weight and Grain yield of Bambara groundnut as influenced by Sokoto rock phosphate at Dryland Teaching and Research Farm of Usmanu Danfodiyo University, Sokoto, Nigeria

Treatment	Plant height (cm)	Number of leaves	Leaf area (cm ²)	Leaf area index	100-grain weight (g)	Grain yield kg ha ⁻¹
Sokoto Rock Phosphate (SPR)(kg)						
0	18.09	27.77	524 ^b	0.524 ^b	61.16	911
20	18.59	30.93	665 ^a	0.665 ^a	64.18	974
40	17.86	31.20	563 ^{ab}	0.563 ^{ab}	61.46	782
60	18.54	28.62	573 ^{ab}	0.573 ^{ab}	60.59	851
80	18.20	32.69	646 ^a	0.646 ^a	60.17	736
SEM	0.321	1.515	38.4	0.03840	2.066	85.6
P values	0.471	0.165	0.045	0.045	0.350	0.311

Means followed by same letter(s) in a column do not differ significantly (P>0.05). SEM= Standard error of means, P values= probability values

- The results obtained revealed a significant (P<0.05) influence of Sokoto phosphate rock on leaf area and leaf area index and were maximum at application of 20 kg ha⁻¹ and other parameters (plant height, number of leaves per plant, day to 50% flowering, day to 50% maturity, number of pods per plant, total dry weight, pod yield (g), grain weight, shell weight, shelling percentage, haulm weight, stover weight, harvest index (%), 100-grain weight) measured were not significantly influenced by the application of sokoto phosphate rock on the crop.
- The leaf area and leaf area index obtained in this experiment were within the range of work reported by (Essel *et al.*, 2024). Application of 20kg of Sokoto Phosphate Rock produced wider leaves than 0, 40 and 60 kg ha⁻¹, but was statistically similar to 80kg ha⁻¹.

CONCLUSION

- From the finding of this study, application of 20 kg ha⁻¹ Sokoto phosphate rock is recommended to improve vegetative growth (leaf area and leaf area index) of Bambara groundnut under dryland conditions.