

POD YIELD ESTIMATION OF CAMEL'S FOOT *Piliostigma reticulatum* (Hochst) IN THE FALLOW AREAS OF KEBBI STATE

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ABSTRACT

The study was conducted to estimate the pods yield of *Piliostigma reticulatum* in the fallow areas of Kebbi State. Physical parameters of selected trees were measured in 50mx50m and the pods harvested at maturity, dried and weighted. All the parameters measured were significantly ($P<0.05$) different among the areas. The highest plant height and crown diameter were recorded in Dalijan (6.02m) and Andrail (5.94m) areas, while the lowest plant height and crown were recorded in Shiko areas with 3.41m and 4.32m respectively. The highest and the least pod weights were recorded in Giron Masa (4.01kg) and Dalijan (1.16kg) areas. The result of regression analysis reveals a positive correlation between the pod weights, crown diameter and the plant heights.

Key words: Pod yield estimation, Camel's foot, Fallow areas

INTRODUCTION

The extensive system of livestock production in tropical Africa is characterized by seasonal grazing. The main feed consists of natural or semi-natural grasslands, fallow lands, harvest residues, open bush, lopping from edible browse trees and coppice (Crowder and Chheda, 1982). Among the edible browse trees is the Camel's foot, a shrubby tree growing up to 15m high with a dense spreading crown. It is considerably widely spread in tropical Africa and usually found in the tall grass savannah forest (Keay *et al.*, 1964). It is a property tree around Sokoto State (Arnborg, 1988) because it is a good source of fodder, fuel wood and industrial raw materials (NEST, 1990).

Browse productivity is not well known for a number of reasons among which are the difficulty of accurately measuring growth and consumable primary production. The various

productivity values are spread over a range according to ecological conditions and above all, mean annual rainfall and soil quality (Pamo and Pieper, 1989). In the study area, there is little information available on the pod production of this species. Recent study (Muftau *et al.*, 2016) conducted in the grazing reserves of Kebbi State have shown that the pod yield of *P. Reticulatum* depends on the magnitude of the crown diameter and the plant heights.

It is on this basis that the present study was carried out to evaluate the pod yield of Camel's foot in the fallow areas of Kebbi State.

MATERIALS METHOD

Study Area

The study was conducted in the uncultivated fallow areas of Kebbi State during the 2014/2015 dry season. The State lies at the extreme North West corner of Nigeria on latitudes 10° to 13°

15¹ and longitude 3⁰30¹ to 6⁰ East. Annual rainfall ranges between from 550mm-650mm occurring between April and September. The mean temperature is 23⁰c, maximum is about 38⁰c and the minimum is about 18⁰c. The relative humidity ranges from 21-47% and 51-79% during the dry and rainy seasons respectively (KARDA, 2006).

Three areas were purposely selected in each senatorial district (north, central and south) of the State. A survey was conducted in the fallow areas from each selected area to determine the density of Camel's foot per hectare. Three sampled plots each measuring 50mx50m were randomly mapped out and demarcated on a 5km transect. Data on plant height and crown diameter of selected trees were collected and the harvested matured pods were dried and weighted.

Data Analysis

The data obtained were processed using the General Linear Module in SPSS (2007). Analysis of variance and regression analysis was carried out to determine the relationship between the plant physical parameters on the fruit production and to predict the yield of Camel's foot in the fallow areas of Kebbi State. Means were separated using the Duncan's New Multiple Range Test (DNMRT) at $p=0.05$.

RESULTS AND DISCUSSION

The mean plant height, crown diameter and the weight of pods of Camel's foot from the fallow areas in Kebbi State were presented in Table 1. Significant difference ($p<0.05$) occurred among the areas in their plant heights, crown diameter and the pod weights. The highest and the least plant heights were recorded in Dalijan (6.02m) and Shiko (3.41m) areas. The highest crown diameter was recorded in Andrail area (5.94m)

and the least was in Shiko area (4.32m). The highest pod weight recorded was in Giron Masa area (4.01kg) and the least recorded was in Dalijan area (1.16kg). There were no fallow areas in Kangiwa, Hilema and Ribah.

It was observed that the pod weights increased as the plant height and crown diameter increases in all the fallow areas with the exception of Dalijan and Hilema. In the fallow areas, there was a positive correlation between the pod weights, crown diameter and the plant height. Increased in the plant height and crown diameter gives more increase in the pod weights. The relation obtained in the fallow areas of Kebbi State is as follows:

$$YKFA = 0.189 X1 KFA + 0.302 X2 KFA + 0.16$$

Y= weight of pods; X1= plant height; X2= crown diameter

In the fallow areas, there was a positive correlation between the pod weights, crown diameter and the plant heights. Increased in crown diameters and plant heights gives more increase in the pod weights.

Weight of pods across the areas in the fallow areas vary according to the plant heights and the crown diameter of the plant in most of the areas (Table 1). The variations of crown diameter and the plant heights that exist among the fallow areas affect the yield of the pod. This is in agreement with the findings of Yelemou *et al.* (2007) and Muftau *et al.* (2016) that the fruit productivity of *P. reticulatum* was related to the magnitude of the tree's crown and plant heights. This explains the reason for the higher pod weights of the plant in Giron Masa (4.01kg), Birnin Yauri (2.98kg), and Tsamia (3.37kg) areas. The variation of pod yield among the areas in the fallow areas could be explained by varied ecological conditions such as edaphic factor, rain and soil nutrients (Yelemou *et al.* 2007).

Absence of some fallow areas as observed in this study was due to the demand of land areas for human activities like settlement and arable farming which has taken more of the range land. This observation was in agreement with Olorunnisomo and Adewumi (2005) that the natural grassland which exists mostly in the northern parts of Nigeria has greatly been reduced by human activities like farming, settlement and road construction.

CONCLUSION

The pod yield in the fallow areas increases in relation to the magnitude of the plant heights and the crown diameter in most of the areas. The pod productivity of *P. reticulatum* depends on the ecological condition of the areas particularly rainfall.

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Table 1: Yield Estimation of Camel's foot in Fallow Areas of Kebbi State

Areas	Plant height (m)	Parameters	
		Crown diameter (m)	Pod weight (kg)
Kangiwa	0.00 ^d	0.00 ^c	0.00 ^g
Shiko	3.41 ^e	4.32 ^d	2.33 ^d
Tsamia	5.10 ^b	5.41 ^{bc}	3.37 ^b
Dalijan	6.02 ^a	5.34 ^{bc}	1.16 ^f
Hilema	0.00 ^d	0.00 ^e	0.00 ^g
Andrail	3.65 ^e	5.94 ^a	1.71 ^e
Ribah	0.00 ^d	0.00 ^e	0.00 ^g
Giron masa	5.03 ^b	5.12 ^c	4.01 ^a
Birnin yauri	5.29 ^b	5.72 ^{ab}	2.98 ^c
SEM	0.18	0.16	0.09

abedefg: means on the same row with different superscripts were significant ($P < 0.05$)