



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



## ANALYSIS OF THE AWARENESS OF BANANA BUNCHY TOP DISEASE (BBTD) AMONG FARMERS IN IDOLOGUN VILLAGE, OGUN STATE

Akinyemi, S.O.S<sup>1</sup>; Adebisi-Adelani O.<sup>1</sup>; Layade A.A<sup>1\*</sup>; Adegbite, O.<sup>1</sup>; Arogundade O<sup>1</sup>;  
Fajinmi O.B.<sup>1</sup> and Kumar L.<sup>2</sup>

<sup>1</sup> National Horticultural Research Institute, P.M.B. 5432, Idi-Ishin, Jericho, Ibadan, Nigeria

<sup>2</sup> International Institute of Tropical Agriculture, P.M.B. 5320, Oyo Road, Ibadan, Nigeria.

\*CORRESPONDENCE E-MAIL: jumlay408@gmail.com Telephone: 08065222750

### ABSTRACT

Nigeria is one of the major producers of plantain and banana in Africa. However, banana/plantain production in Nigeria is threatened by newly emerging disease called Banana Bunchy Top Disease (BBTD). This has continued to impede banana and plantain production in affected areas. The need to analyse farmer's awareness of banana farmers of this disease is imperative. Thus, this is a preliminary study to examine the economic and livelihood effect of BBTD on farmers in Nigeria. Primary data were obtained through the use of structured questionnaire on seventy farmers using a two-stage sampling technique. Data were analysed using descriptive and binary logistic regression model. The result revealed that more female (54.4%) participated in plantain/banana farming with the average age of the farmer being 41 years. About 90% of the respondents were married with 5.2 years on education. About 81% of the farmers were aware of BBTD. 72.1% of the respondents experienced reduction in yield due to BBTD. Binary logistic regression result showed that year of formal education and extension service were positive and significant factors affecting farmers awareness of BBTD ( $p < 0.05$ ). The study recommends improved extension service delivery to the farmers in affected areas. Also, there is need for urgent intervention by the stakeholders to prevent the spread of the disease.

**KEYWORDS:** Musa spp., banana disease, production, eradication, intervention.

### INTRODUCTION

Banana and plantain (*Musa spp.*) are important staple foods in many developing countries, especially in Africa (Kumar, 2014). They are highly nutritious fruits containing large amounts of carbohydrates and minerals such as phosphorus, calcium and potassium as well as vitamins A and C. Banana and Plantain play crucial roles in strengthening food security and reducing poverty levels in many developing countries such as Nigeria (FAO, 2008; Adejoro *et al.*, 2010). Nigeria is one of the largest plantain producing countries and ranked 5<sup>th</sup> in the world after Uganda, Cameroon, Ghana and Colombia. The total production of plantain as at 2007 stood at 2,991,000 tons but declined to 2,800,000 indicating a decrease of 6.39% (FAOSTAT, 2012), although the value increased in 2014 to 3,039,929 tons. The highest production levels are in the states of Akwa-Ibom, Anambra, Benue, Cross River, Imo, Kwara, Enugu, Plateau, Kogi, Rivers, Edo, Delta, Lagos, Ogun, Osun and Oyo (Ekunwe and Ajayi, 2010) and for more than 20 years, the country has witnessed a steady rise in the production of these crops (Akinyemi *et al.*, 2010).

However, the production of plantains and bananas is hampered by a variety of challenges (Etebu and Young-Harry, 2011). Diseases have been identified as one of the constraints to production (Mohandras and Ravishankar, 2016). The most devastating and newly emerging viral disease of banana/plantain in Nigeria is BBTD. It is caused by *Banana Bunchy Top Virus*

(BBTV; genus *Babuvirus*, family *Nanoviridae*) and the virus is transmitted in persistent manner by banana aphid (*Pentalonia nigronervosa*). It also spreads through infected planting materials, suckers and corms (Lepoint, 2014). The spread of *Banana bunchy top virus* (BBTV) has negatively impacted the livelihoods of farming households in Sub-Saharan Africa (CGIAR, 2014). The occurrence of BBTD represents a serious threat to food security in the regions where banana is one of the staple crops for small-scale farmers (Niyongere *et al*, 2012). Currently, BBTD has been reported in 14 countries in Africa including Nigeria (Kumar, 2014). Recently, BBTD has been reported in three Local government areas in Ogun state being the first affected state in Nigeria. It is against this background that this paper intends to analyse the awareness of banana bunchy top disease among farmers in Idologun village, Ogun state, Nigeria.

The specific objectives are to:

- i. Describe the socioeconomic characteristics of plantain/banana farmers in the study area.
- ii. Ascertain the level of awareness of BBTD among farmers in the study area.
- iii. Determine the factors that influence awareness of BBTD in the study area.

## METHODOLOGY

### Study area

This study was conducted in Idologun village. The village is located in Ipokia Local government area. The Ipokia Local Government is located in the western part of Ogun State, Nigeria. It has the coordinates of 6°47'0"N and 2°49'0"E of the Greenwich meridian covering an area of 629 square kilometres (Maplandia, 2014). Food crops grown in the area include yam, maize, cassava, rice, plantain and banana. The area has average rainfall is 1246mm and the mean annual temperature of 27 degree Celsius (Climate data, 2017). The village is close to Idiroko community bordering Republic of Benin.

### Sampling technique and data collection

A two-stage sampling technique was used in selecting respondents for the study. The first stage involved purposive selection of Idologun community, in Ipokia local government area, Ogun state Nigeria due to the recent outbreak of BBTD and other production constraints in the study area. The second stage involved the random selection of 70 plantain/banana farmers in the community. However, only primary data collected from 68 respondents using structured questionnaire were found useful for the study.

### Methods of data analysis

Analytical tools employed in the study include descriptive statistics and logistic regression model.

Descriptive statistics used includes frequency count and percentage. Binary logistic regression was used to estimate the factors that determine awareness of farmers about BBTD in the study area. Binary logistic model is appropriate when the response or dependent variable take only two values i.e dichotomous variable and the independent variables are either continuous or categorical (Gujarati, 2009; Park, 2013). The dependent variable, Y, takes one if the farmer is aware of BBTD or Zero if the farmer is not aware.

The model for binary logistic regression was specified and estimated thus:

$$Y = \ln[p/(1-p)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \dots\dots\dots(1)$$

Where,

Y = Awareness about BBTD (1 for Aware, 0 otherwise)

X<sub>1</sub> = Sex (1 for Male, 0 for otherwise)

X<sub>2</sub> = Marital status

X<sub>3</sub> = Years of Education

X<sub>4</sub> = Extension contact of farmer (1 for yes, 0 for no)

X<sub>5</sub> =Household size  
ε = error term

RESULTS AND DISCUSSION

Socioeconomic characteristics of the farmers

The result of the analysis revealed that 54.4% of the total respondents were female (Table 1). The fact that more female respondents engaged in plantain/banana production in the study area implies that they are to be considered and given preference in any production techniques overhaul or interventions. The finding supports Nwaobiala and Ogbonna (2014) and Ironkwe *et al* (2008) who reported that most of the bulk food produced in Nigeria was by women farmers. On the contrary, Akinyemi *et al* (2013) found out that more male respondents engaged in *Musa* spp production than female in the southwestern part of the country. In the same vein, majority (23.6%) of the respondents had their age range between 30 and 39 years followed by 40-49 years (21.9%) and 20-29 years (19.1%). The mean age of the farmers was 41 years. This is an indication that people who are less than 50 years were involved in plantain production in the study area and it implies that people of this age range are likely to be energetic and make significant contribution to banana/plantain agriculture. The result also showed that 89.7% of the respondents were married with their spouses still alive. This implies that *Musa* production is a reliable source of income for the upkeep of the family. Based on the years of formal education 35.3% had no formal education. Specifically, 38.2% of them spent between 1 and 6years in school (equivalent of primary school education), 22.1% spent 7 to 12 years in school (equivalent of secondary school education), while only 4.4% spent above 12 years. The mean duration spent in formal education setting was 5.2 years. This implies that the respondents had a level of formal education which should help them in understanding and adoption of innovations. The table further shows that plantain/banana farmers had mean household size of 6 persons. This finding agreed with Agboola *et al* (2014). This implies that the larger the household size, the more family labour is available for farm production.

Table 1: Socioeconomic characteristics of the farmers

Variables	Frequency	Percentage
Sex		
Male	31	45.6
Female	37	54.4
Age (years)		
<20	1	1.5
20-29	13	19.1
30-39	16	23.6
40-49	15	21.9
50-59	6	8.9
60-69	8	11.9
>69	3	4.4
No response	6	8.8
Average age	41years	
Marital Status		
Single	4	5.9
Married	61	89.7
Widowed	3	4.4
Year of Formal Education		
None	24	35.3
1-6 years	26	38.2
7-12 years	15	22.1
> 12 years	3	4.4
Mean	5.2	
Household size		
1-5 persons	39	57.4
6-10 persons	26	38.2
> 10 persons	3	4.4
Mean	6	

Source: Field survey, 2014

**Farm characteristics and production activities in banana/ plantain production**

Results in table 2 revealed that the respondents are small scale farmers as all of them have less than one hectare of farmland. The highest percentage (73.5%) of the farmers cultivated 1-10 acres of farmland with the average farmsize of 5.4 acres ( $\approx 2.2$  ha). Land ownership plays an important role in making the best use of agricultural land, most (46.2%) of the farmers inherited their farmland, 29.4% leased the land cultivated, while 28.0% purchased their farmland. About 82% of the respondents intercropped plantain and banana with arable crops. It has been reported by Akinyemi and Tijani-Eniola, 2000, Baruwa *et al*, 2011) that intercropping of plantain with other crops is common in most humid areas of the rainforest belt of Nigeria. The major reason why they engaged in intercropping was to have security against crop failure and increase profitability. However, most of the farmers in the study area, do not intercrop plantain with cassava and sweet potato because these crops were considered to affect the growth and yield of Plantain and Banana. In terms of labour, 57.4% of the respondents utilized a combination of self, family and hired labour in production operations while 95.6% of the farmers relied on self for their source of capital. Majority (69.1%) of the farmers do not belong to any association. This conformed with the findings of Bifarin and Folayan, (2009); Ekunwe and Ajayi, (2010), that most plantain farmers are not members of cooperatives; thus suggesting that a majority do not have direct access to regional markets or credit facilities, which would presumably limit farmers' ability to access production inputs and reduce the potential yields (Dzomeku *et al.*, 2011).

**Table 2: Farm characteristics and production activities in banana/ plantain**

Variables	Frequency	Percentage
<b>Farm size (acre)</b>		
< 1	10	14.7
1-10	50	73.5
11-20	6	8.8
21-30	1	1.5
> 30	1	1.5
Mean	5.4	
<b>Ownership of land</b>		
Self	19	28.0
Inherited	29	42.6
Rented/leased	20	29.4
<b>Crops grown</b>		
Plantain/ banana	41	60.3
Arable crops	26	38.2
Cash crop	1	1.5
<b>Do you intercrop?</b>		
Yes	56	82.4
No	12	17.6
<b>Source of labour</b>		
Hired	14	20.6
Family	6	8.8
Self	9	13.2
All combined	39	57.4
<b>Association membership</b>		
Yes	21	30.9
No	47	69.1

Source: Field survey, 2014

**Awareness of BBTD**

The awareness level about BBTD is high among the farmers. About 81% have heard about BBTD and 67.6% are experiencing the disease in their field (Table 3). Moreover, 88.2% first noticed the disease about five years ago but could not identify it, probably due to their low level of education, and this might have aided the spread of the disease in the community. According to Lepoint *et al.*, (2014). Banana bunchy top disease (BBTD) is the most devastating virus disease of banana/plantain. The spread of Banana bunchy top virus (BBTV) has negatively impacted the livelihoods of farm households in sub-Saharan Africa (Tossou *et al*, 2015).

**Table 3: Response on awareness of BBTD**

	Frequency	Percentage
<b>Are you aware of BBTD?</b>		
Yes	55	80.9
No	13	19.1
<b>Are you experiencing BBTD on your farm?</b>		
Yes	46	67.6
No	22	32.4
<b>When BBTD was first noticed on your farm?</b>		
Between 1 -5years	60	88.2
More than 5years	8	11.8

Source: Field survey, 2014.

**Effect of BBTD on the respondents**

Although the respondents could not ascertain the amount of loss due to BBTD, they noticed reduction in yields and income from their plantain and banana plantation. Specifically, 72.1% of the respondents experienced reduction in yield and income. The yield, income and general livelihood remained unchanged for 27.9% of the farmers in the study area. This findings Agreed with Kumar (2014) which gave BBTD effect in affected region indicate 50% to 90%. The agronomic changes of BBTD as identified by the respondents were as follow: stunted growth of the plant, clustering of leaves which later turn brown, narrow and small leaves which stand straight, deformed fruits are produced and at times no fruit is produced.

**Factors determining Farmers' Awareness about BBTD**

The result of logistic regression model indicates that year of formal education and extension service were significant factors influencing the awareness of BBTD awareness among the plantain/banana farmers in the study area (Table 4). Coefficient of the years of formal education was positive and significant at 5% alpha level. This implies that increase in the year of formal education will enhance farmers' awareness about BBTD. This supports the finding of Sureshkumar *et al*, 2011 that education is a significant factor of awareness. Education status has the tendency of increasing the literacy level of an individual, thereby making him/her accessible to information. Furthermore, coefficient of extension service was positive and significant at 5% alpha level, implying that increase in extension visit will increase awareness about BBTD. The result corroborates Ume *et al*, 2013 who noted extension contact as a factor determining adoption. Extension services help to disseminate information and innovations to the farmers.

**Table 4: Estimate of logistic regression of farmers' awareness about BBTD**

Parameter	Estimate	Standard error	Wald $\chi^2$	Pr> $\chi^2$
Constant	-0.8689	1.0106	0.7392	0.3899
Sex	0.1953	0.4783	0.1668	0.6830
Marital status	-0.8774	0.9091	0.9315	0.3345
Extension	0.8796	0.4142	4.5094**	0.0337
Household size	0.0708	0.1388	0.2602	0.6100
Year of formal education	0.2574	0.1171	4.8356**	0.0279
Likelihood ratio $\chi^2$ (5)	17.2604**			
Wald $\chi^2$ (5)	11.9705**			
No of observation	68			

\*\* denotes significant at 5% level.

## CONCLUSION AND RECOMMENDATIONS

The study has examined the awareness level of the plantain and banana farmers at Idologun Ogun state, Nigeria about Banana Bunchy Top Disease. Most of the farmers were aware of the disease and 67.6 percent are presently experiencing the outbreak on their farms. Many (72.1 percent) of the farmers incurred losses due to significant reduction in yield i.e. number and size of fingers been produced. The following recommendations were made based on the study findings:

- There is need for urgent intervention by the stakeholders to prevent the spread of the disease to adjoining areas.
- Extension service delivery should be improved upon and more awareness about BBTD should be promoted.

## REFERENCES

- Adejoro M.A., Odubanjo A.O. and Fagbola B.O. (2010). Research Focus on Banana and Plantain (*Musa* spp.): Nigerian Perspectives Proc. IC on Banana & Plantain in Africa, *Acta Horticulturae*, 879, ISHS 2010.
- Agboola, W.L, Yusuf S.A and MT. Oloyinni (2014): Determinants of access to Micro-credit among arable crop farmers in Kwara state, Nigeria. *Journal of Applied Agricultural Research* 6(1): 11-23.
- Akinyemi S.O.S. and H. Tijani-Eniola (2000): Effects of cassava density on productivity of plantain and cassava intercropping system. *Fruits*. 55: 17-23.
- Akinyemi, S.O.S., B.S. Alabi, C. Staver, A.E. Adekoya, I.B. Adeoye and A.A. Layade (2013): Role and Constraints of *Musa* Production in Southwestern Nigeria. *Acta Horticulturae*, 1007: 635-640.
- Baruwa, O.I., Masuku, M.B and Alimi, T. (2011): Economic Analysis of Plantain production in Derived Savannah Zone of Osun State, Nigeria. *Asian Journal of Agricultural Science*, 3(5): 401-407.
- Bifarin, J. O., & Folayan, J. A. (2009). Plantain Production in Ondo State, Nigeria: The State of the Arts: 2006/2007. *Continental Journal of Agricultural Science*, 3(2):27-33.
- CGIAR (2014): Report of CGIAR Strategic Planning Workshop on Recovering Banana Production in BBTD Affected Areas: Community & Farm Household Approaches. Held at Bujumbura, Burundi 20-25 January.
- Climate data (2017). Climate Idologun: Temperature, climate graph and climate table. Available online: <https://en.climate-data.org/location/idologun>
- Dzomeku, B. M., Dankyi, A. A., & Darkey, S. K. (2011). Socioeconomic importance of plantain cultivation in Ghana. *The Journal of Animal and Plant Sciences*, 21(2):269-273.

- Ekunwe, P. A., & Ajayi, H. I. (2010). Economics of Plantain Production in Edo State Nigeria. *Research Journal of Agriculture and Biological Sciences*, 6(6): 902-905.
- Etebu, E. and Young-Harry, W. (2011): Control of Black Sigatoka Disease: Challenges and Prospects. *African Journal of Agriculture Research*. 6(3): 503-514.
- FAO. (2008): The state of food insecurity in the world. High food prices and food security threats and opportunities. Available on [www.fao.org/publications](http://www.fao.org/publications).
- FAOSTAT (2012): Food and Agriculture Organization of the United Nations. Production quantity. <http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#ancor>. Accessed on 12/12/2014.
- Gujarati, D.N and Porter, D.C. (2009). *Basic Econometrics*. Fifth Edition, McGraw-Hill Publishing Company, New York.
- Ironkwe, A.G, Ekwe, K.C. and Asiedu, R. (2008). Determinants of Adoption Gaps in Yam Miniset Technology among Women Farmers in Abia State, Nigeria. *Niger J. Rural Sociol.* 8(1): 33-40.
- Kumar, L. (2014): Researchers discuss Banana Bunchy Top Disease with farmers in Nigeria. IITA Bulletin, 29 July- 02 August, 2013 (No. 2183).
- Kumar, L. (2014). Threat of banana bunchy top disease to banana production in sub-Saharan Africa. Pg 11. Report of CGIAR Strategic Planning Workshop on Recovering Banana Production in BBTD Affected Areas: Community & Farm Household Approaches. Held at Bujumbura, Burundi 20-25, Pg 11.
- Lespoint, P. (2014). Better understanding banana bunchy top disease. Report of CGIAR Strategic Planning Workshop on Recovering Banana Production in BBTD Affected Areas: Community & Farm Household Approaches. Held at Bujumbura, Burundi 20-25 January Pg 12.
- Mohandras, S. and Ravishankar, K.V. (2016). *Banana: Genomic and Transgenic Approaches for Genetic Improvement*. Springer Publisher, Singapore. Pg 68.
- Niyongere C., Losenge, T. Ateka, E.M, Nkezabahizi, D. Blomme, G. and Lepoint, P. (2012). Occurrence and distribution of Banana Bunchy Top Disease (BBTD) in the great lakes region of Africa. *Tree and Forestry Science and Biotechnology*, 6(1): 102-107.
- Nwaobiala, C. U and Ogbonna, M. O (2014): Adoption Determinants and Profitability Analysis of Okra Farming In Aninri Local Government Area (LGA) of Enugu State, Nigeria. *Discourse Journal of Agriculture and Food Sciences*, 2(1):1-10.
- Map!andia (2014). Idologun. [Online] Available: <http://www.maplandia.com/link>
- Park, H. (2013): An introduction to logistic Regression: From Basic Concepts to Interpretation with Particular Attention to Nursing Domain. *Journal of Korean Academic Nursing*. 43(2):154-164.
- Sureshkumar D., B.C. Barah, C.R. Ranganathan, R. Venkatrama. S. Gurunathan and S. Thirumoorthy (2011). An Analysis of Farmers' Perception and Awareness towards Crop Insurance as a Tool for Risk Management in Tamil Nadu. *Agricultural Economics Research Review*. 24: 37-46.
- Tossou, C.C., Zandjanakou-Tachin, M. and Avocvo-Ayisso, C. (2015). Recovery of Banana and Plantain for Poverty Alleviation in Two Communities of Benin through Banana Top Virus Eradication. Presentation at Second Annual Review and Planning Workshop of Alliance for BBTD control in Africa. Held at IITA. Ibadan on 9-14 March, 2015.