

*Short Communication*

**Farmers Awareness of Lethal Yellowing Disease among Coconut Varieties in a Certain Area of Edo State, Nigeria**

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**Abstract.** Lethal yellowing disease (denoted as LYD) in coconut (*Cocosnucifera L.*) is widespread in Nigeria. This has led to devastating coconut holdings in the endemic areas. This study is aimed at finding out the extent of awareness of the disease among farmers in Ovia North-East Local Government Area of Edo State, Nigeria. Primary data were collected and analysed. Findings reveal that level of awareness of LYD by coconut growers in the studied area is satisfactory.

**Keywords:** Coconut, lethal yellowing disease, endemic area, NIFOR.

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## 1. Introduction

This study is designed to find out the level of awareness of LYD among coconut farmers in an LYD endemic zone in Nigeria. Coconut (*Cocosnucifera L.*) also called coconut palm or coconut tree is a palm tree that produces a large oval brown seed of a tropical palm, consisting of a hard woody husk surrounded by fibre, lined with edible white flesh and containing a clear liquid (coconut milk) (Angus and Maurice, 2011). The South Pacific and South Africa are often cited as the possible centres of origin (Child, 1974). The coconut palm is divided into two varieties (cultivars), the dwarf and the tall cultivars. It is a multi-purpose palm, whose utility is evident in many domestic, commercial and industrial uses of the different parts. The coconut industry provides both public good (environmental protection and landscape beautification) and private good (clearly seen in its range of commercially saleable products).

The coconut palm is affected by a disease known as Lethal yellowing disease (denoted as LYD). The disease LYD constitutes a great threat to coconut. According to Nair, Odewale and Ikuenobe (2003), LYD is a major cause of decline in coconut industry in Nigeria. It is considered as the single most important threat to the coconut industry because it spreads rapidly, killing susceptible palms within a short time (Harries, 1978). The disease symptoms include premature dropping of most of the nuts regardless of size, development of necrosis of new inflorescences with blackening of tips and death of most of the male flowers, yellowing of lower fronds and a gradual spread to younger leaves and the collapse of the newly emerged spear leaf and death of the terminal buds.

Studies at several institutions, including the Nigerian Institute for Oil Palm Research (NIFOR), Nigeria, have attributed the causal agent of LYD in coconut to phytoplasma, formally referred to as mycoplasma-like organisms (MLOs). These micro-organisms are consistently found colonizing the phloem of palms with symptoms of LYD. According to Dery and Philippe (1995), LYD has destroyed several thousand hectares of coconut fields in its endemic areas. In Nigeria, over 5,000 diseased palms were destroyed in the course of the epidemic when it was first reported in 1917 as Awka Wilt at Akwa (Johnson, 1918). Since 1980, the disease has gradually spread to different parts of Nigeria (Ekpo and Ojomo, 1990; Osagie and Asemota, 1997; Osagie et al., 2008; Omamor et al., 2010).

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## 2. Methodology

This study was carried out at Ugbogiobo, Iyowa, Ekonobore, Ekiadolor and Okokhuo villages in Ovia North-East Local Government Area of Edo State. The local government area is one of the eighteen local government areas in the state with its headquarters at Okada. The population of the study comprises all coconut growers in the study area. For effective study, a sample of 40 coconut growers was selected at random. The simple random sampling technique was employed to select respondents for the study. This technique involves the selection of a part of the population to represent the whole as there was no reason not to assume that a common feature exists among coconut growers. A structured questionnaire was designed and administered to 40 selected coconut growers at random. The questionnaire consists of two sections: The first section contains the social demographic information of respondents and the second section provides information on coconut production and the possible economic impact of LYD (see Appendix).

The data collected was analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as mean, standard deviation, frequencies and percentages were used to summarize the data on the target population.

## 3. Results and discussion

The results of the data analysis are presented in Table 1.

Table 1: Demographic information of respondents

	Frequency	%
<b>Town/Village of Respondents</b>		
Ekiadolor	14	35.0
Ekodebo	2	5.0
Iyowa	8	20.0
Obarenren	2	5.0
Okokhuo	14	35.0
Total	40	100.0
<b>Age of Respondents (Years)</b>		
31-40	2	5.0
41-50	4	10.0
51-60	34	85.0
Total	40	100.0
<b>Gender of Respondents</b>		
Male	34	85.0
Female	6	15.0
Total	40	100.0
<b>Marital Status of Respondents</b>		
Married	40	100.0
Single	0	0.0
Separated	0	0.0
Divorced	0	0.0
Widowed	0	0.0
Total	40	100.0
<b>Education</b>		
No formal education	8	20.0
Primary	14	35.0
Secondary	10	25.0
NCE	4	10.0
HND	2	5.0
Degree	2	5.0
Total	40	100.0

Source: Field Survey (2015).

The results in Table 1 show that a large proportion 14 (35%) of the respondents are from Ekiadolor and Okokhuo villages in Ovia North East Local Government Area of Edo State. The age brackets of the respondents are 31-40 (5%), 41-50 (10%) and 51- 60 (85%). A majority of the respondents are between 51 and 60 years. The vast majority 34 (85%) of the respondents are males while the remaining 6 (15%) are females. Thus, the coconut growers are predominantly males. This agrees with Saito, Mekonnen and Spurling (1994). All respondents 40 (100%) are married. The distribution of respondents by level of education shows that 8(20%) had no formal education, 14 (35%) had primary education, 10 (25%) had secondary education, 4(10%) had NCE while 2 (5%) had HND or degree, respectively. This simply means that majority of the respondents had primary education.

Table 2: Respondents' views on coconut production and effect of LYD

	Yes	No
<b>Growing of Coconut</b>		
Grow Coconut	40	100.0
Do Not Grow Coconut	0	100.0
Total	40	100.0
<b>Awareness of LYD</b>		
Aware	34	85.0
Not aware	6	15.0
Total	40	100.0
<b>Incidence of LYD</b>		
Incidence	20	50.0
No incidence	20	50.0
Total	40	100.0
<b>Application of Treatment</b>		
Apply	0	0.0
No Application	40	100.0
Total	40	100.0
<b>Effectiveness of Treatment</b>		
Effective	0	0.0
Not Effective	0	0.0
No Response	40	100.0
Total	40	100.0
<b>Profitability of growing coconut</b>		
Profitable	28	70.0
Not profitable	0	0.0
No response	12	30.0
Total	40	100.0

Source: Field Survey (2015)

Table 2 indicates that 34 (85%) of the 40 coconut growers are aware of LYD while 6 (15%) of them are unaware of the disease. A total of 20 (50%) of the respondents confirmed that their palms have been affected by LYD, while the remaining 20 (50%) said that their palms are not affected by the disease. As regards application of treatment on coconut palms during LYD incidence, all respondents 40 (100%) said they did not apply any treatment. The majority 28 (70%) of the respondents consider coconut growing as profitable.

Results from Table 3 show that the 'Number of Palms Affected by LYD' is the least volatile, while the 'Average Annual Sales Income before LYD' is most volatile. More so, the distribution of coconut stands owned is skewed to the right and the price per nut before LYD is skewed to the left. The kurtosis values show that the distribution of number of stands owned has the highest number of peaks (modes); thus, indicating a multi-modal distribution. On the other hand, the price per unit nut before LYD distribution has the least number of modes.

#### 4. Conclusion

This study has found that the level of awareness of LYD by coconut growers in the studied area is satisfactory. This provides an ample opportunity for relevant agricultural authorities for easy enlightenment of these coconut growers in the use of modern coconut planting practices and LYD preventive measures. For instance, the farmers may be encouraged to grow the green dwarf coconut variety. Incentives may also be put in place for women and the unemployed youths to encourage them to embrace coconut farming. These suggestions are likely to increase coconut productivity in Nigeria.

#### References

- Angus, S. and Maurice, W. (2011). Concise Oxford English Dictionary (12th ed.). United Kingdom.  
 Child, R. (1974). Coconuts (2nd Ed.). Longmans, Green and Co., London.  
 Dery, S.K. and Philippe, R. (1995). Results of preliminary study of the epidemiology of the Cape St. Paul Wilt disease of coconut in Ghana. Proceedings of the International Workshop on Lethal Yellowing-like Diseases on Coconut, Elma, Ghana. pp. 14.  
 Ekpo, E.N. and Ojomo, E.E. (1990). The spread of lethal coconut diseases in West Africa: incidence of Awka disease

Table 3: Descriptive statistics for primary data

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Std. Error
Years of Growing Coconuts	40	2.00	24.00	10.8000	6.12351	.562	.374	.451
Number of Coconut stands Owned	40	1.00	200.00	14.4500	43.43988	4.190	.374	16.672
Number of Palms Affected by LYD	40	.00	11.00	1.9500	2.83703	1.840	.374	3.446
Number of Coconuts Sold per annum without LYD	40	.00	8000.00	1064.0500	1804.55027	3.058	.374	9.931
Number of Coconuts Sold per annum with LYD	40	.00	336.00	54.7500	113.71980	1.735	.374	1.312
Price per nut before LYD (Naira)	40	.00	100.00	39.0000	25.60048	-.173	.374	.318
Price per nut During LYD (Naira)	40	.00	50.00	10.0000	20.25479	1.559	.374	.451
Average Annual Sales Income Before LYD (Naira)	40	.00	400000.00	43410.0000	90925.71158	3.299	.374	11.055
Average Annual Sales Income After LYD (Naira)	40	.00	15600.00	1760.0000	4376.90911	2.317	.374	4.128
Valid N (listwise)	40							

Source: Field Survey (2015)

- (or bronze leaf wilt) in the Ishan area of Bendel State of Nigeria. *Principes*, **34**:143-146.
- Harries, H.C. (1978). Lethal yellowing disease of coconut in global perspective. *Philippine Journal of Coconut Studies*, **3**(3):1-4.
- Johnson, W.H. (1918). Annual Report of the Agricultural Department of Southern Province, Nigeria for the Year 1917. Government Publication. pp. 16.
- Nair, R.V., Odewale, J.O. and Ikuenobe, C.E. (2003). Coconut nursery manual. Nigerian Institute for Oil Palm Research (NIFOR), Nigeria. pp. 27.
- Omomar, I. B., Eziashi, E. I., Asemota, O. A., Aisagbonhi C. I. and Ogunkami L. A. (2010). DNA molecular analysis between lethal yellowing disease and non-lethal yellowing disease of coconut palms (*Cocosnucifera L.*) in Nigeria. *Trends in Molecular Sciences*, pp. 1-8.
- Osagie, J. I. and Asemota, O. (1997). Occurrence of Awka wilt disease of coconut in Nigeria. Proceedings of the International Workshop on Lethal Yellowing-Like Disease of Coconut, Elmina, Ghana. pp. 33-37.
- Osagie, J. I., Okwuagwu, C.O., Ojomo, E.E., Okolo, E.C., Ataga, C.D. and Odewale, J.O. (2008). The status of the Akwa Wilt/Lethal Yellowing Disease (LYD) of the Coconut in Lagos State: NIFOR Badagry Substaion: NIFOR In-house Review. pp. 112-115.
- Saito, K.A., Mekonnen, H. and Spurling, D. (1994). Raising the productivity of women farmers in Sub-Saharan Africa. World Bank Discussion Paper, pp. 17.

## Appendix

**QUESTIONNAIRE ON ECONOMIC COST OF LETHAL YELLOWING DISEASE (LYD) ON COCONUT YIELD IN LYD ENDEMIC ZONE OF NIGERIA: A CASE STUDY OF NIGERIAN INSTITUTE FOR OIL PALM RESEARCH (NIFOR) AND ENVIRONS.**

**SECTION A – Social Demographic Variables**

1. Town/Village: \_\_\_\_\_
2. Age: 21-30 { } 31-40 { } 41-50 { } 51>60 { }
3. Gender: Male { } Female { }
4. Marital Status: Married { } Single { } Separated { } Divorced { } Widowed { }

**5. Education**

- a. No Formal Education { }
- b. Primary { }
- c. Secondary { }
- d. Tertiary
  - i. AL { }
  - ii. NCE { }
  - iii. OND { }
  - iv. HND { }
  - v. Degree { }
  - vi. Higher Degree { }

**SECTION B: Coconut Production and Economic Cost of LYD**

1. Do you grow coconut? Yes { } No { }
2. If yes to question 1, for how long? { } years { }
3. Are you aware of Lethal Yellowing disease (LYD)? Yes { } No { }
4. How many stands of coconut do you have on your farm? \_\_\_\_\_
5. Which variety/varieties of coconut do you have on your farm
  - a. West African tall { }
  - b. Dwarf green { }
  - c. Malayan Dwarf yellow { }

- d. Malayan Dwarf Red { }  
 e. Hybrid Coconut { }
6. Are your coconut palms affected by LYD? Yes { } No { }
7. If yes, how many of the palms are/were affected? \_\_\_\_\_
8. Which of the varieties was/were affected by the disease?
- a. West African tall { }  
 b. Dwarf green { }  
 c. Malayan Dwarf red { }  
 d. Malayan Dwarf yellow { }  
 e. Hybrid coconut { }
9. Did you apply any treatment on LYD infected coconut? Yes { } No { }
10. If yes, what treatment did you apply?
- a. Use of antibiotic { }  
 b. Removing affected palms and planting of tolerant coconut varieties { }  
 c. Planting of cover crops { }  
 d. Use of insecticides { }  
 e. Others specify { }
11. Was the treatment applied effective? Yes { } No { }
12. What is your average yield per annum?
- a. Without LYD incidence? { }  
 b. With incidence of LYD? { }
13. What was the price per nut?
- a. Before LYD incidence? { }  
 b. During LYD incidence? { }
14. What was your annual income from the sale of coconut
- a. Before LYD incidence? { }  
 b. After LYD incidence? { }
15. Do you consider coconut farming/growing profitable? Yes { } No { }