

## Assessment of pest management strategies used in mango production in Ogbomoso Agricultural Zone of Oyo state

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**Abstract:** Mango is an important horticultural crop in the rural economy of Ogbomoso Agricultural zone of Oyo state since it serves as a good source of income for farmers. However, the production of mango is being threatened by pests. This study focused on the assessment of pest management strategies employed by mango farmers in the study area. A multistage sampling procedure was adopted in selecting 360 mango farmers and structured interview schedule was used to obtain data from them. Descriptive statistics such as means, standard deviation, percentages and frequency counts were used to describe the data. Pearson Product Moment Correlation (PPMC) was employed as inferential tool. The major pests of mango in the study identified by farmers included fruit flies, flower feeders, twig borers and termites. The study reveals that pest management strategies used by mango farmers included regular pruning (72.5%), trappings (65%), weeding (75%) and use of pesticides (85%). Poor marketing outlet, pests and diseases incidence, low price of produce and lack of information on modern techniques of mango production were constraints indicated by farmers in the study area. There were significant correlation between farmers' age ( $r = -0.875$ ,  $p < 0.045$ ), farm size ( $r = 0.724$ ,  $p < 0.005$ ), farming experience ( $r = -0.535$ ,  $p < 0.564$ ), year of formal education ( $r = 0.812$ ,  $p < 0.032$ ) and pest management strategies used by farmers in the study area. The study concluded that mango farmers in the study area used several pest management strategies. It is recommended that extension agency should intensify efforts at educating farmers on the use of Integrated Pest Management (IPM) strategies in mango production.

**Keywords:** Mango pest management, Pesticides, Pruning, Trapping

### INTRODUCTION

Mango (*Mangifera indica* L.) is a tropical evergreen deciduous tree which belongs to Anacardiaceae family and indigenous to India and Southeast Asia. It is cultivated for its edible fruit that varies in shape (kidney, round, oblong, oval). World production of mango was estimated at 35 million tons in 2009 with a production area of 5 million hectares. India is the largest producer of mango in the world accounting for about 13.5 million MT about half of world production in 2009, while Nigeria ranked 8<sup>th</sup> in the world with a mango production of 828,161 MT in 2009. It is instructive to note that Nigeria does not feature in the league of ECOWAS exporters of mango (ITC, 2011).

There are many varieties of mangoes produce in Nigeria such as Julie, Peter, Hindi, John Peter and Zill (Ugese *et al.*, 2012). However, Kerosene and Sherri are the famous varieties of mangoes produced in the study area. Mangoes are mostly grown by peasant farmers in rural communities. A greater percentage of mango fruits is produced in Guinea and Sudan savanna zones of Nigeria (Olaniyan, 2004); with cultural practices limited to weeding and little attention paid to the enhancement of plant nutrition in the form of inorganic fertilizer application (ITC, 2011).

Mango fruit has a single flat and kidney-shaped seed surrounded by flesh that is rich in vitamins A, C

and D. (<http://www.chiangmai>, 2014) In Nigeria, mangoes are mostly consumed as fresh fruit (Ugese *et al.*, 2012). However, it can also be consumed in processed form as juice, puree, pickles, chutney, jam, flakes and mango pulp. Mango production also serves as a good source of income for farmers especially women and youths at the end of dry season. Based on the above information, it is very obvious that mango can be said to be nutritionally and economic important to the rural households. It is very pertinent to note that horticultural industry in sub-Saharan Africa is generally being threatened with several constraints like the incidence of pests and diseases (Norman, 2003). Pests' infestation in mango orchards in Ogbomoso agricultural zone had been observed and poses a big threat to mango production as a lucrative business in the area. This study was designed to gather reliable information on pest management practices with respect to mango and identify major constraints militating against the sustainable production of mango fruits. Therefore, this study was embarked upon to:

1. describe the socioeconomic characteristics of mango farmers,
2. identify common mango pests in the study area,
3. assess mango pest management strategies used by mango farmers and
4. identify key constraints to mango production.

**Hypothesis of the study**

There is no significant relationship between selected socioeconomic characteristics of mango farmers and the use of pest management strategies in mango production.

**METHODOLOGY**

The study was carried out in Ogbomoso agricultural zone of Oyo state in southwest Nigeria. It is one of the four agricultural zones in Oyo state and comprises five Local Government Areas (LGAs) namely: Ogo-Oluwa, Surulere, Orire, Ogbomoso north and Ogbomoso south. The major occupation of rural people in this zone is farming and they engage in the cultivation of crops like maize, yam, cassava, sorghum, fruit and leafy vegetables, cashew and mango.

A multistage sampling procedure was used in selecting respondents for the study. The first stage involved the purposive selection of three LGAs (Ogo-Oluwa, Surulere and Orire) being rural LGAs and their popularity in mango fruit production. Random selection of two villages from each of the LGAs was carried out at the second stage. A list of mango producers was developed from the selected villages with the assistance of Extension officers in the area. A total of 360 mango producers was selected for interview and the size of sub-samples taken from each of the selected villages was determined by the proportionate availability of mango producers. Data were collected using a pre-tested interview schedule. Descriptive statistics such as frequencies, percentages, mean and standard deviations were used to describe the data. Pearson Product Moment Correlation (PPMC) was employed as inferential statistical tool.

**RESULTS AND DISCUSSION**

**Socioeconomic characteristics of respondents**

Socioeconomic characteristics of mango farmers who participated in the survey are presented in Table

1. The age distribution indicates that more than one third (38.3%) of the farmers were within the age range of 41- 50 years, while only 8.4% were within the age range of 21 – 30 years and the mean age was 50.6 years. This is an indication that the respondents are still in their active working age. The marital status distribution shows that majority (90.0%) of the farmers were married while a small proportion (7.5 %) were still single. Majority (95.0%) of mango farmers were male,, while the remaining percentage (5.0%) were female indicating a strong gender disparity in mango fruit production in the study area. However, a majority of these female farmers were widows and female household heads whose husbands had left the area in search of better jobs. Less than one third (30.8%) of the farmers had no formal education. Only 1.7% had less than six years of formal education, more than half (60.8%) had between six and twelve years of formal education and 6.7% had above twelve years of formal education. This high literacy level is likely to make the majority of the farmers more responsive to improved technologies with respect to pest management in mango fruit production than those without formal education (Adeola, 2015).

Table 1 also shows that majority (90.8%) of the mango farmers were still operating at small scale level having mango trees scattered on their farms within the range size of 2 – 4 hectares. It was observed that farmers did not pay attention to regular spacing in planting their mango trees which is likely to negatively affect the optimum plant population expected per hectare. Mango fruit production experience of farmers were within the range of than 5 years to 20 years and above with a mean year of experience in mango production stood at 18. 8 years (Table 1). This substantial experience in mango production is likely to enable them to take a right decision in adopting an innovation that would enhance mango fruit production.

**Table 1: Distribution of respondents according to socioeconomic characteristics n = 360**

Variables	Frequency	Percentage
<b>Age (years)</b>		
21 -30	30	8.4
31 -40	39	10.8
41 -50	138	38.3
51 – 60	102	28.3
Above 60	51	14.2
<b>Marital status</b>		
Single	27	7.5
Married	324	90.0
Widow	9	2.5
<b>Sex</b>		
Male	345	95.8

Variables	Frequency	Percentage
Female	15	4.2
<b>Years of formal education</b>		
Below 6	6	1.7
6 – 12	219	60.8
Above 12	24	6.7
No formal education	111	30.8
<b>Farm size (Hectares)</b>		
< 2	327	90.8
2 – 4	27	7.5
> 4	6	1.7
<b>Farming experience (Years)</b>		
< 5	22	6.1
6 – 10	52	14.4
11 – 15	86	23.9
16 – 20	136	37.8
> 20	64	17.8

Source: Field survey, 2015

Table 2 shows the list of pests being encountered by mango farmers in the study area. Fruit flies happened to be the major pests of mango being experienced by farmers (52.5%) in the area, closely followed by flower feeders (47.5%). Other pests indicated by farmers included ants (29.2), twig borers (20.8%) and termites (19.2%). The presence of these

pests if left uncontrolled could pose a threat to the production of mango fruit in the study area. This is a great challenge for extension to acquaint farmers with innovations capable of tackling the pest invasion and strategies that can reduce the losses that might be due to pests in mango fruit production.

**Table 2. Distribution of mango farmers by pests encountered on their orchards**

Pests	*Frequency	Percentage
Termites	59	19.2
Fruit flies	189	52.5
Twig borers	75	20.8
Ants	105	29.2
Flower feeders	171	47.5

\* Multiple responses. Source: Field survey, 2015

### Pest management strategies used by mango farmers

The study found that mango farmers were using some strategies for the control of pests in their mango orchards (Table 3). The strategies included the pruning operation that involves cutting of some dead or diseased branches that was always and often performed by 52.5% and 20.0% of the respondents, respectively. Weeding was also a pest control strategy always (55.6%) and often (37.5%) carried out by mango farmers in the study area. Also, the study reveals that the use of pesticides was a common pest control strategy always (85.0%) used by mango

farmers. However, use of synthetic chemical insecticides for the control of mango pests by mango farmers may pose a risk to their health and the surrounding environment. Inadequate knowledge of the appropriate recommended insecticides is likely to expose both the producers and consumers to serious health risks. Banjo (2010) opined that indiscriminate use of pesticides could lead to actual yield loss, extinction of natural enemies and development of resistance by these pests to the pesticides.

**Table 3: Distribution showing pest management strategies among mango farmers n= 360**

Strategies	Always	Often	Rarely	Never
Pruning	189 (52.5)	72 (20.0)	33 (9.2)	66 (18.3)
Weeding/slashing	200 (55.6)	135 (37.5)	25 (6.9)	0 (0.0)
Trapping	134 (37.2)	120 (33.3)	26 (7.3)	80 (22.2)
Use of pesticides	306 (85.0)	42 (11.7)	4 (1.1)	8 (2.2)

Figures in brackets represent percentages

Source: Field survey, 2015

### Constraints to mango fruit production

The study found that constraints to mango production indicated by the respondents included, poor marketing outlet (60.0%), the incidence of pests and diseases (79.2%), low price of produce (57.5%) and lack of information on modern techniques of mango production (Table 4). This is an indication that pests and diseases incidence was a common

constraint frequently experienced by farmers in mango fruit production in the study area. Research has shown that pests and diseases had the highest frequency of problems commonly encountered by farmers in mango production (Ajayi and Nyishir, 2006). This implies that there is a need for concerted efforts on the part of researchers and extension agents to make pests and diseases control strategies available to mango farmers.

**Table 4: Distribution of respondents based on constraints to mango fruit production n = 360**

Constraints	Frequency*	Percentage
Poor marketing outlet	216	60.0
Pests and disease incidence	285	79.2
Low price of the produce	207	57.5
Lack of information on modern techniques	261	72.5

Source: Field survey, 2015

\* Multiple responses

### Relationship between mango farmers' selected socioeconomic characteristics and use of pest management strategies.

The results of the analysis as shown in Table 5 reveal that age (-0.875,  $p \leq 0.05$ ) of the farmers had a negative and significant relationship with the use of pest management strategies. This implies that as the farmers advance in age, there is a tendency to use fewer strategies in controlling mango pests in their orchards. However, the younger farmers may be willing to invest and use more strategies in order to make the mango production a profitable enterprise. With respect to farm size, a positive and significant ( $r = 0.724$ ,  $p \leq 0.05$ ) relationship existed between the farm size and the use of pest management strategies in mango production. This implies that as farm size increases along with an increase in mango tree population, a farmer is likely to assume more responsibilities of managing the orchards by

employing more strategies in protecting the trees against pest infestation. The analysis also reveals that farming experience had negative but not significant relationship ( $-0.535$ ,  $p \leq 0.01$ ) with the use of pest management strategies. Farmers' experience in mango fruit production would have made them realized the production of mango fruits as a non-profitable enterprise due to low market outlets and prices hence, it is needless to engage in the use of one or more strategies to control pests. The results further show that education also had a positive and significant ( $0.812$ ,  $p \leq 0.05$ ) relationship with the use of pest management practices. This is an indication that farmers with higher education are likely to be more responsive to new ideas and this would probably lead to their quest for more pest management strategies in combating the pest problems in mango fruit production.

**Table 5: Relationship between some selected socioeconomic characteristics and use of pest management strategies**

Variables	r value	p value	Remark
Age	-0.875	0.045	Significant
Farm size	0.724	0.005	Significant
Farming experience	-0.535	0.564	Non-significant
Education	0.812	0.032	Significant

### CONCLUSION AND RECOMMENDATION

This study has shown that farmers had been making use of some pest management strategies in their efforts to control pests in mango fruit production. Pest management strategies employed by farmers include pruning, trapping, weeding and use of pesticides (synthetic chemicals). However, other pest management strategies such as biological

control, use of resistant cultivars and use of natural resources were not known to the mango farmers in the study area. The study, therefore, recommends an intensive effort of extension agencies in educating farmers especially on the use of appropriate synthetic chemicals as well as encourage IPM strategies in mango production. A timely intervention of extension agency in this direction would go a long way to

ensuring sustainable development in mango fruit production.

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