



Mango Farmers Resilience Strategies on the Incidence of Fruits Flies in Northern Parts of Kaduna State

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ABSTRACT

The research was primarily conducted to assess mango farmers resilience strategies on the incidence of fruits flies in Northern Parts of Kaduna State. Data for the study was collected through personal observations, oral interviews and the use of structured questionnaire. The study unveils that mango varieties popularly grown in the study area include; Jambul, Apple, Peter's, Julie, Kerosene, Opiro, Abuja and Sheri varieties. Julie and kerosene mangoes varieties were found to be highly susceptible to fruits flies' infestation in the study area with the highest percentage score of (30% and 25%) respectively due to their high aroma characteristics, while Jambul and Apple Mango varieties were found to be less susceptible to fruits flies attack with a score of (5% and 2.5%) respectively due to their thick skin composition and less aromatic characteristics. Integrated Pest Management control strategy and the cultivation of fruits flies resistant varieties (Jambul, Apple) constitute the best farmers resilience practices against incessant fruits flies attack on mango plantations in the study area.

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INTRODUCTION

The mango industry stands as a vital pillar within the realm of global agriculture, contributing significantly to both local sustenance and international trade. In recent times, however, this flourishing sector has encountered a formidable challenge in the form of fruits flies' infestation, causing a pervasive threat that imperils the quality and yield of mango crops (Akisanmi and Adebajo, 2019). The impact of fruits flies' infestation on mango production is far-reaching, leading to substantial economic losses and diminished product quality. Within this broader context, understanding the varietal susceptibility of mangoes to fruits flies becomes a critical aspect for sustainable cultivation and successful export ventures (Akisanmi and Adebajo, 2019).

Previous studies have acknowledged variations in susceptibility among different mango varieties, but there still exists a notable gap in the literature pertaining specifically the intricacies of

diverse geographic and climatic contexts. In light of the above, conducting a comprehensive investigation into mango varietal susceptibility to fruits flies will help to shed light on the specific dynamics at play within the mango orchards, providing valuable insights that can inform effective strategies for pest management, enhance local production, and safeguard the integrity of mango exports at both regional and international fronts (Sharma and Singh, 2019).

Mango cultivation holds a pivotal role in the agricultural landscape of Kaduna State, serving as a key contributor to both local sustenance as food, industrial raw material and economic prosperity through export activities. However, the thriving mango industry in the state is now facing a formidable challenge in the form of fruits flies' infestation that jeopardizes the quality and quantity of mango yields. As the incidence of fruits flies continues to impact on orchards, the need to understand mango varietal susceptibility becomes increasingly urgent. Variations in

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susceptibility among different mango varieties have been identified in existing literature, yet a comprehensive understanding of these dynamics within the specific context in Kaduna State remains elusive (Prasad et al., 2018).

The economic implications of fruits flies' infestation on mango production are profound, leading to reduced marketable yield and compromised fruits quality with potential repercussions which extend beyond local markets to impact on international trade, where adherence to stringent quality standards is paramount (Ekesi et. al., 2018). Therefore, recognizing the critical intersection of varietal susceptibility, fruit fly infestation, and the consequent effects on mango production for exports, this research aims to bridge the existing knowledge gaps by conducting a thorough investigation into the susceptibility profiles of prominent mango varieties cultivated in Northern part of Kaduna State,

STATEMENT OF THE PROBLEM

The mango industry in numerous regions faces a critical challenge most especially the menace of fruits flies' infestation, which poses a significant threat to both the quality and quantity of mango production. Kaduna state is not an exception particularly in the context of varietal susceptibility, where certain mango varieties may exhibit distinct levels of vulnerability to fruits flies' attacks (KADA, 2023). Despite the acknowledged impact of fruits flies on mango production among farmers, there still exist a gap in our understanding of how different mango varieties respond to infestation, especially in diverse agricultural settings like that of Kaduna State. This knowledge deficiency impedes the formulation of targeted and effective pest management strategies, hindering local farmers and authorities from implementing measures that could safeguard mango yields.

Additionally, the implications extend to the export sector, where adherence to stringent international quality standards is imperative for maintaining market competitiveness. Hence, without a comprehensive understanding of varietal susceptibility and its Cascading effects on production and exports, the mango industry will

face heightened risks of economic losses, compromised product quality, and potential trade restrictions. Under this background, the study aims to address the critical knowledge gaps surrounding farmers choice of mango variety for production due to varietal susceptibility to fruits flies so as to offer a sustainable and resilient strategies to fortify mango production and secure the viability of export markets.

Objectives of the Study

The main objective of the research was to asses mango farmers resilience strategies on fruits flies' infestation and Its effects on mango production in Kaduna State. Among the specific objectives were to:

1. identify mango varieties popularly grown in the Northern parts of Kaduna State.
2. determine the level of susceptibility of the mango varieties to fruits flies' infestation in the Northern part of Kaduna State.
3. identify mango farmers resilience strategies in respect of fruits flies' incidence in the Northern part of the State.

Research Questions

The following research questions have been highlighted to guide the study.

1. What are the mango varieties popularly grown in the Northern part of Kaduna State?
2. What are the varieties level of susceptibility to fruits flies' infestation in the study area?
3. What are the mango farmers resilience measures or strategies adopted to eradicate/control fruits flies in the study area ?

METHODOLOGY

Research Design

According to Onwunali (2025), a research design is the set of methods and procedures used in collecting and analyzing measures of the variables specified in the



problem research. A research design is essentially a plan structure and strategies of investigation connived so as to obtain answers to research questions. A survey research design will be used for the research work. The reason for adopting survey research design is because the researcher intends to describe conditions that already exist and how its influence farmers choice on variety of mango to produce.

Study Area

The study area is Northern part of Kaduna State which consist of eight local government areas, including; Ikara, Kubau, kudan, Lere, Makarfi, Sabon Gari, Soba, and Zaria, which all are located in the Northern Senatorial Zone of the State (KSPA, 2021). As at the last census report in 2006, the Northern part of Kaduna State has a total population of 4.1 million people. The annual rainfall in the zone varies between 1,100mm and 1,400mm. The monthly average rainfall is about 361 mm between May and September, with the wettest month being August (Ghali et al., 2020). However, the zone is known for its agricultural activities, especially in the area arable land suitable for Mangoes plantation.

Population of the Study

According to Onwunali (2025), Population is the summation of organisms of the same group or species living in a particular geographical area and has the capability of inter-breeding. Similarly, Makarfi (2023) defined population as the study which consists of people or group of people, organizations/institutions, products and social events. the population of the study consist of mango farmers within the Northern part of Kaduna state consisting of zaria, Sabon-Gari, Markarfi, Lere, Kubau, Kudan, Soba and Ikara local government area of kaduna state.

Sample Size and Sampling technique

In order to achieve the objectives of this study; the sampling procedure of the study was tailored towards the reduction of the target population to a manageable size so as to obtain reliable information that will aid inferences and

generalization. The sampling technique used by the researchers was the accidental sampling techniques. The choice of accidental sampling technique was necessary because it will be difficult for the researcher to reach the entire mango farmers within Zone of Kaduna State. As such, the researcher targeted 5 mango farmers per each local government constituting Northern part of Kaduna state making a total of 40 mango farmers altogether.

Instruments for Data Collection

The primary data was collected from the mango farmers by the use of structured questionnaire as well as oral interview where necessary, in which forty (40) questionnaires were designed, and five (5) goes to each of the Local Government Area within the study area. Personal observation with pictures taken were made in order to support the respondents responses in respects of mango fruits varieties susceptibility to fruits flies' infestation and farmers resilience strategies on the incidence of fruit flies on mango plantation.

Procedure for Data Analysis

The procedure used in analyzing the data involves the use of simple descriptive statistics that includes; frequency count and percentages, which were finally tabulated in a bar-chart to illustrate the existing situation in the field.

RESULTS

The results and discussions were presented based on the stated research questions in chapter one as follows;

Identification of popular Mango Varieties Grown in Northern Part of Kaduna State

Mango Varieties Popularly Grown in Northern Part of the State



Figure 3.1: Jambul Mango



Figure 3.2: Apple Mango



Figure 3.3: Kerosene Mango



Figure 3.4: Peter's Mango



Figure 3.5: Sheri's Mango



Figure 3.6: Julie's Mango

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Identify Mango Varieties Level of Susceptibility to Fruits Flies' infestation in the Northern Part of Kaduna State

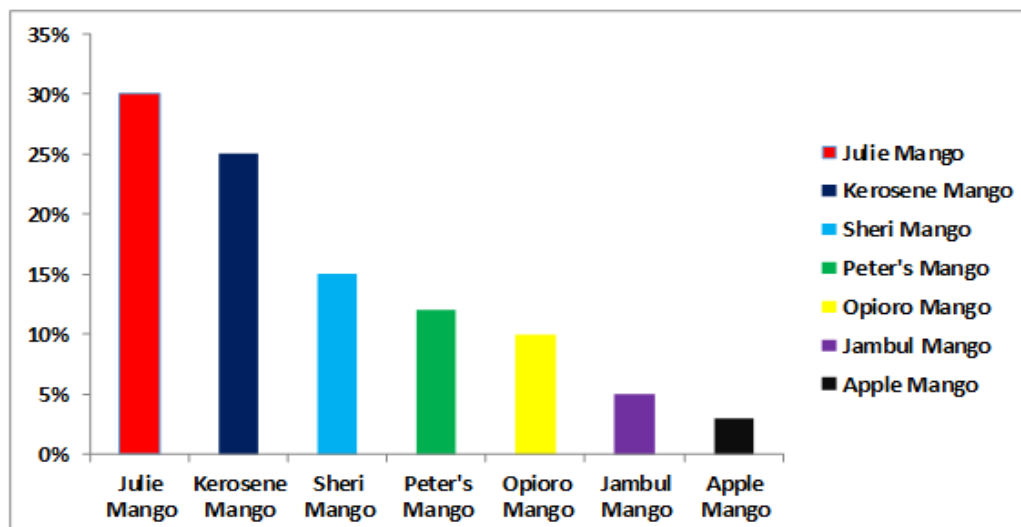


Figure 3.2.1: Mangoes Level of Susceptibility to Fruits Flies' infestation

The results in figure 3.2.1 above, shows the level of susceptibility of mangoes varieties to fruits flies' infestation in the study area in hierarchical order as follows; Julie Mango > Kerosene mango and Kerosene Mango > Sheri mango, Sheri Mango > Peter's mango, and Peter's mango > Opioro mango, Opioro mango > Jambul mango, while Jambul mango > Apple mango which recorded lowest susceptibility level to fruits flies attack among other varieties. This implies that Julie (Jewel) and Kerosene mangoes are the most highly susceptible varieties of mangoes to fruits flies' infestation in the study area with the highest percentage score of (30% and 25%) possibly due to their thin skin and high aromatic characteristics which make them more attractive to these pests. while Jambul and Apple

Mango varieties recorded lowest susceptibility levels to fruits flies attack due to their thick skin characteristic among others. This study also agrees with the findings of Olaniyi and Odebiyi (2013) as well as Umeh and Onu (2015) on a similar study conducted in South Western parts of Nigeria in which Julie and kerosene varieties of mango were found to be highly susceptible to fruit fly infestation there by reducing both quantity and quality of harvest due to their aromatic characteristics.

Mango Farmers Resilience Strategies Adopted Against Fruit Flies Incidence in the Northern Part of Kaduna State

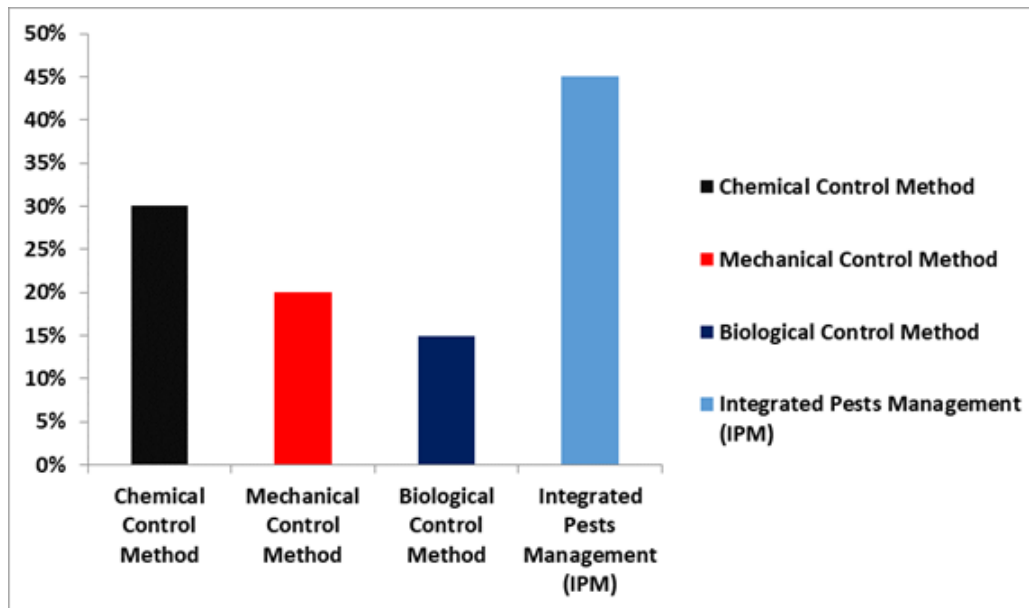


Figure 3.3.1: Mango Farmers Resilience Strategies Adopted Against Fruit Flies incidence

The results in figure 3.1.1 above, shows the resilience measures adopted by Mango farmers in the Northern part of Kaduna State with 45% of the Mango farmers adopting the use Integrated Pests Management (IPM) control method, while 30% of the farmers adopting the use chemical control method (e.g., use of pesticides) and 20% of the farmers adopting the use of Mechanical Control Method (e.g., use of trapping nets). The least recorded among other methods was the use Biological Control Method with a score of 15% (natural predators,). IPM control strategy recorded the highest percentage among other control methods, because it is more effective and environmentally friendly.

Summary of Research Findings

In summary, Major mango varieties grown in the study area include; Jambul, Apple, Peter's, Julie, Kerosene, Opioro, Abuja and Sheri variety. While jambul and apple variety constitute the most popular and resistant variety to fruit fly infestation, Julie and kerosene were rank as the most susceptible mango varieties to fruit fly attack in the study area. Mango farmers resilience strategies against fruit fly infestation include

cultivation of fruit fly resistance varieties like jambul and apple and the adoption of integrated pest management strategy and chemical method been the best strategy among others to eradicate /control fruit fly in their mango plantations in the study area.

CONCLUSION

In conclusion, the results obtained in respect of the topic under research in the Northern part of Kaduna state is similar to the outcome of previous research conducted and consulted in literature from different parts of the country and even beyond. Thus, similar farmers resilience strategies from literature were also found adopted by the mango farmers within the study area to eradicate fruit flies in their mango plantations and this constitute a major reason why the existing fruit flies susceptible mango varieties in the farmers plantations visited were outgrown or facing out in most of the mango plantations visited within the study area because of low yield and high cost of farm maintenance. Hence, this research work has agrees with the outcome of previous research works conducted across diverse areas in respect of fruit fly incidence and control measures.

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RECOMMENDATIONS

The research recommends that, farmers should increase the scale Jambul and Apple mango cultivation in the study area in combination with other varieties that shows certain level of resistance to fruit fly infestation like peter's and Opioro in order to have better mango yield for food Security objective, enough industrial raw material and for export from Kaduna state. Lastly, the horticultural extension outfit of the Kaduna State Agricultural Development Agency (KADA) in collaboration with National Fruit Flies Control Agencies are mandated to wage a campaign educating /sensitizing farmers on mango fruit fly incidence and resilience strategies for better mango yield in the study area.

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