

**ABUNDANCE OF REJECTED MANGO (*Mangifera indica* L.) SOLD IN ALIMODIAN,
ILOILO INFESTED WITH MANGO FRUIT-BASED PESTS.**

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Requirements in Research 2

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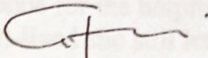
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APPROVAL SHEET

This Research Paper Hereto Entitled:

“Abundance of Rejected Mango(*Mangifera indica* L.), Sold in Iloilo Supermarket, Infested with Mango Fruit-based Pests”


Prepared and submitted by John Marti Maghopoy in partial fulfillment of the requirements in Science Research 2 has been examined and recommended for acceptance and approval.



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
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Mangoes are one of the most important tropical fruits in the Philippines; however cultivating mangoes isn't easy considering the pests these fruits harbor which includes the mango fruit fly (*Bactrocera dorsalis*), the mango pulp weevil (*Sternochetus frigidus*), and mango seed weevil (*Sternochetus mangiferae*). Knowing the abundance of these pests in locations like Alimodian, Iloilo is important for they can guide mango cultivators in choosing preventatives needed.

This research study determines the abundance of each pest infestation in mangoes from Alimodian, Iloilo that were sold in Iloilo City on the month of November. Mangoes were collected from the group of mangoes from Alimodian that were labeled "rejected", were placed in a container, and were then left to rot and then dissected to know the type of pest larvae that contained each mango.

The samples were collected on November 2009 in Iloilo Supermarket. A total number of 44 mango fruits out of the approximately 200 rotten or infested were sampled.

It was then found out that there were 79.55% of mangoes with mango fruit fly infestation, pulp weevil with 11.36% and seed weevil with 4.54% which is only minimal compared to fruit flies. Therefore, mango cultivators in Alimodian should focus more of their pest prevention methods on fruit flies and less priority on mango and pulp weevils during the months of November.

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Introduction

Figure 1. Percentage of pest infestation

Table 1. Number of rejected mangoes

Mango (*Mangifera indica* L.) is one of the most important tropical fruits (Castro-del Campo and Claudio-Quirós, 2005). In the Philippines, mango is a source of livelihood for Filipino mango growers and also for market vendors; however, cultivating mangoes needs proper interventions. There are many setbacks in the mango growing business, one of them are the mango infesting pests. Few of these pests found in the Philippines in the mango fruit are (Guavafruit borer), the mango pulp weevil (*Stenocarpus fragariae*), and mango seed weevil (*Narwecheta mangiferae*). All these pests are responsible to lay their eggs in the mango fruit. These pests are greatly decrease the number of quality mangoes because of their large numbers and also affect the income of mango cultivators negatively by lower number of sold mangoes through lower market. Knowing the occurrence of these pests in infesting mangoes in various locations like Alameda, Davao and the mango fruit's variety is important for they can be a guide to mango cultivators in choosing of pest management tactics.

B. Statement of the Problem:

This study determined the species of mango infested pests causing the rejected mangoes.

Chapter 1

Introduction

A. Background of the Study

Mango (*Mangifera indica* L.) is one of the most important tropical fruits (Castro-del Campo and Chaidez-Quiroz, 2009). In the Philippines, mangoes are a means of livelihood for Filipino mango growers and also for market vendors; however, cultivating mangoes needs proper maintenance. There are many setbacks in the mango growing business, one of these are the mango infesting pests. Few of these pests found in the Philippines is the mango fruit fly (*Bactrocera dorsalis*), the mango pulp weevil (*Sternochetus frigidus*), and mango seed weevil (*Sternochetus mangiferae*), all these pests uses oviposition to lay their eggs in the mango fruit. These pests can greatly decrease the number of healthy mangoes because of their large numbers and also affect the income of mango cultivators negatively for lower number of sold mangoes means lower income. Knowing the dominance of these pests in infesting mangoes in various locations like Alimodian, Iloilo and the mango fruit's variety is important for they can be a guide to mango cultivators in choosing of preventatives needed.

B. Statement of the Problem:

This study determined the species of mango fruit-based pests infesting the rejected mangoes.

C. Objectives of the Study:

1. This study aimed to determine the number of mangoes according to its pest infestation and variety of mango fruits, located in Alimodian, Iloilo and sold in Iloilo Supermarket during the month of November.
2. This study aimed to interpret the most dominant pest by determining the percentage of each pest infested mango and in each variety of mango fruit.

I. Scope and Delimitation

The mangoes used are the ones rejected in Iloilo Supermarket from Alimodian, Iloilo and only during the month of November. The pests that were considered are only mango fruit fly, mango pulp weevil, and mango seed weevil, other pests that may infest the mango were not part of this study.

F. Significance of the study

This study will help the mango cultivators in Alimodian, Iloilo to know the right amount of preventatives against these pests so that they would properly budget their preventatives.

H. Definition of terms

Mango (*Mangifera indica* L.) – Mangoes belong to the genus *Mangifera*, consisting of numerous species of tropical fruiting trees in the flowering plant family Anacardiaceae. The mango has many uses including food, color, and fragrance and is native to the Philippines, India, and Southeast Asia. (California Rare Fruit Growers Inc, 1996.)

Indian or Katchamita mango variety- originated from India and commonly known as Indian Mango. Skin is green and flesh is yellowish. (Department of Agriculture, 1999)

In this study, mangoes were the variables that were dissected to know the species of mango fruit pest.

Mango fruit fly (*Bactrocera dorsalis*)- Fruit flies are an important group of insects damaging mango fruits in the various mango-areas of the world. (Pena, 1998)

In this study, fruit flies were one of the pests that were found in the rejected mango fruits.

Mango pulp weevil-Mango pulp weevil, also known as mango flesh weevil, is a pest specific to mangoes. (Cunningham, 1991)

In this study, mango pulp weevils were one of the pests that were found in the rejected mango fruits. They bore in the mango and eat the pulp of the mango.

Mango seed weevil-Mango seed weevil, also known as mango stone weevil is a pest specific to mangoes. (Cunningham, 1991)

In this study, mango seed weevils were one of the pests that were found in the rejected mango fruits. They bore in the mango and consume the seed of the mango.

Infest- to overrun a place or site in large numbers and becoming threatening, harmful, and sometimes deadly. (Encarta dictionary, 2005)

In this study, the pests that were being identified infest the mango fruit.

Oviposition- is the process of laying eggs by oviparous animals. (Encarta dictionary, 2005)

In this study, the fruit flies use oviposition in infesting the mango fruit.

Chapter 2

Review of Related Literature

A. Mangoes (*Mangifera indica L.*)

A1. Definition of Mango

A mango is a tropical fruit that originated in Southeast Asia. Food historians believe the mango has been cultivated for over 4,000 years in the areas in which it was initially found. It is now grown in most countries with tropical or near tropical climates. There are over 100 different types of mangoes, and two of the famous ones in the Philippines. (London Fruit, Inc., 1998-2002)

A2. Economic Value

The mango is one of the most popular fruits in the world. It is a tropical fruit of great economic importance because of its nutritional value (Castro-del Campo, Chaidez-Quiroz, 2009). Apart from being high in calories, mangoes are also rich in a large number of nutrients and hold great nutritional value which includes high in carbohydrates which is good for those trying to gain weight, and being high in iron, mango is said to be very good for pregnant women as well as for people suffering from anemia. (<http://lifestyle.iloveindia.com/lounge/benefits-of-mango-1428.html>, 2003)

A3. Stages of mango growth

The mango has four stages, the seedling stage, the vegetative stage, the reproductive stage, and the maturation stage; the pests in this study are found in the maturation stage of the mango fruit. (oisat.com, 2003)

A4. Carabao Variety

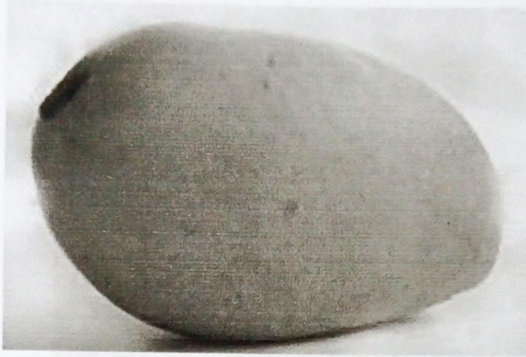


Plate 1. Carabao mango

Also known as Manila super mango, this variety originated from the Philippines. The fruit weighs about 10 oz. and is elongated, kidney-shaped, and light green blushed yellow. The seed is very large; the flesh is stringy and juicy. (California Rare Fruit Growers Inc, 1996.)

A5. Indian or Katchamita Variety



Plate 2. Indian mango

This variety originated from India and is commonly known as Indian Mango. The skin is green and the flesh is yellowish, and is rounder shaped compared to other varieties. (Department of Agriculture, 1999)

B. Mango fruit fly (*Bactrocera dorsalis*)

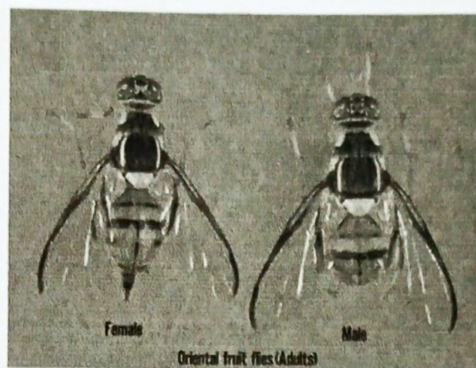


Plate 3. *Bactrocera dorsalis*



Plate 4. *Bactrocera dorsalis* larvae.

B1. Distribution

The oriental fruit fly is widespread throughout much of Pakistan, India, Sri Lanka, Sikkim, Myanmar, Indonesia (Celebes, Borneo, Sumatra, Java), Malaya, Thailand, Cambodia, Laos, Vietnam, southern China, Taiwan, Philippine Islands, Micronesia, and Mariana Islands (Guam, Rota, Saipan, Tinian). (Weems, Heppner, 1999)

B2. Development

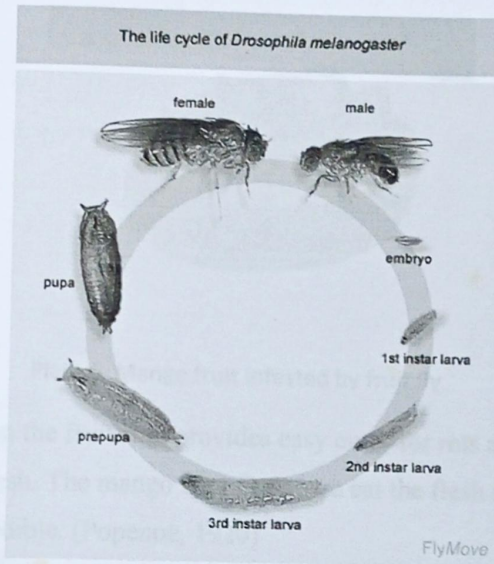


Plate 5. Fruit fly life cycle

Development from egg to adult under summer conditions requires about 16 days. The mature larva emerges from the fruit, drops to the ground, and forms a tan to dark brown puparium. Pupation occurs in the soil. The developmental periods may be extended considerably by cool weather. Under optimum conditions with the right temperature, a female can lay more than 3,000 eggs during her lifetime, but under field conditions from 1,200 to 1,500 eggs per female is considered to be the usual production. Ripe fruit are preferred for oviposition, but immature ones may be attacked. (Weems and Heppner, 1999)

B3. Damage



Plate 6. Mango fruit infested by fruit fly

Laying of eggs on the fruit skin provides easy entry for rots and maggots, which feed on the flesh. The mango fruit fly larvae eat the flesh and seed of the fruit rendering it unedible. (Popenoe, 1920)

C. Mango weevil

C1. Mango pulp weevil



Plate 7. Mango pulp weevil

Mango pulp weevil (*Sternochaetus frigidus*) is a serious exotic pest that tunnels into the flesh of mangoes making them unfit to eat. (Department of Employment, Economic Development and Innovation, 2007)

"The grubs bore in the kernels of the mango fruit when it is growing large; these grubs pupate inside the fruit and as the mango ripens become beetles, eating their way out through the pulp of the fruit, which they spoil." Maxwell-Lefroy recommends that all infested fruits be destroyed, and that weevils hiding in the bark of the tree be killed in August.

The mango seed and pulp weevil can be differentiated by their habit of feeding, with the seed weevil within the seed of the mango rather than the pulp weevil within the flesh of the mango. (Department of Employment, Economic Development and Innovation, 2007)

C2. Mango seed weevil

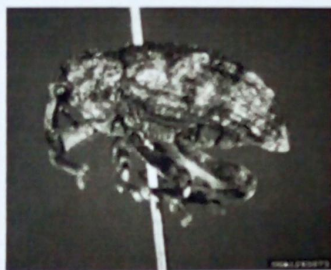


Plate 8. Mango seed weevil

Mango seed weevil is considered to be a nocturnal insect, which feeds, mates and oviposits at dusk. Adult weevils usually remain in the vicinity of the original infestation until the following fruiting season. In some areas, mango seed weevil infestations have been recorded at greater than 80% (Cunningham, 1991).

D. Related Studies

A similar study conducted a survey that was conducted in Queensland in which percentage of seed weevil infestation was studied and it was found out that there were 80% infestation by seed weevils outside orchards and 15% in side orchards. (Cunningham, 1991)

Chapter 3

METHODOLOGY

Equipment needed

- Container for the mango fruits
- Gloves
- Forceps
- Sawdust

Fruit sampling

The mango (*Mangifera indica* L.) varieties Carabao and Indian were the specific species that were sampled and examined. The samples were collected on November 4, 2009 at 6 am morning in Iloilo supermarket; the mangoes were taken from the reject group of mangoes. A total number of 44 rejected mango fruits out of the approximately 200 rotten or infested were sampled, both carabao and Indian varieties. The samples were then placed in two wooden containers with screen covers on top and filled with sawdust. The containers were then delivered to the PSHS-WV research laboratory and were placed there for thirteen days from Nov. 5 to Nov. 18, 2009. The mangoes were individually measured for length and width and then dissected for mango pests on Nov. 18, 2009.

Fruit dissection

The mangoes were individually identified for variety and then dissected for mango pests on Nov. 18, 2009. The infested fruit were cut slightly in half and were thoroughly examined for any pest larvae and pest infestation symptoms with the use of forceps.

Chapter 4

This research study aimed to know the cause of oviposition, impurities and the abundance of each pest infestation in mangoes from Alimodian, Iloilo that were sold in Supermarket Iloilo City on the month of November. Mangoes were collected from the group of mangoes from Alimodian that were labeled “rejected”, and were then left to rot and then dissected to know the type of pest larvae that contained each mango.

Results

Table 1 shows that out of the 44 rejected mangoes, there were 35(79.55%) rejected mangoes with fruit fly infestation, five(11.36%) with pulp weevil infestation, two(4.54%) with seed weevil infestation, and two(4.54%) mangoes which had no infestation. Figure 1 shows the percentage of each pest infestation in the sampled mango fruits and its variety.

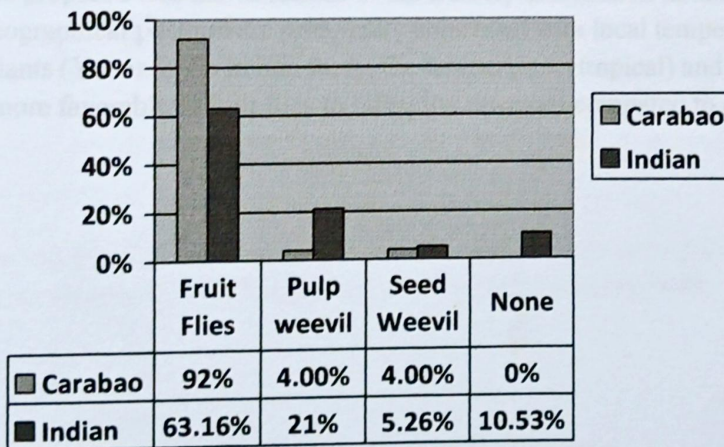


Figure 1. Percentage of pest infestation.

Table 1. Number of rejected mangoes.

Variety	Fruit flies	Pulp weevil	Seed weevil	None
Carabao	23	1	1	0
Indian	12	4	1	2

Discussion

As the data in figure 1 shows, there were 79.55% of rejected mangoes with mango fruit fly (*Bactrocera dorsalis*) larvae infestation which indicates that fruit flies are the most abundant among mango pests from Alimodian, Iloilo that were sold in Iloilo City on the month of November. The weevils only infested 15.91% mangoes, pulp with 11.36% and seed with 4.54% which is only minimal compared to fruit flies.

A similar study by Schiner had results that mango fruit flies made up 53% of pests infesting mangoes in Papua New Guinea. (2002)

It is proposed that the variations of the fruit fly distribution in land altitude and geographical position are principally correlated with local temperatures and host plants (Yunnan). So in this study, the temperature (tropical) and mangoes were more favorable to fruit flies to infest the mangoes compared to other pests.

Mango fruit flies are the most abundant among mango pests from Alimodian, Iloilo that were sold in Iloilo City on the month of November Iloilo.

The monitoring of the infestation of mango pests should be continued throughout the year so that any significant trends or change can be detected, and in broader areas and in longer time, for this study only covered the commercial mangoes in the month of November.

Chapter 5

This study aimed to know the number of rejected mango fruits according to their pest infestation and variety of mango fruits, located in Alimodian, Iloilo and sold in Iloilo Supermarket during the month of November.

A. Summary of Key Findings

The mangoes with fruit fly infestation consists of 79.55% of the total mango samples which basically means majority of the mangoes were infested by fruit flies compared to other mango pests, and only 9.09% were infested by pulp weevils and 4.55% by seed weevils.

Of all the mango pests from Alimodian, Iloilo that were sold in Iloilo City on the month of November the mango fruit fly infests most of the mangoes compared to other pests. Pulp weevils rank the second and the seed weevils the least amount of infestation.

B. Conclusion

Mango fruit flies are the most abundant among mango pests from Alimodian, Iloilo that were sold in Iloilo City on the month of November Iloilo.

C. Recommendations

The monitoring of the abundance of mango pests should be continued throughout the year so that any significant trends or change can be detected, and in broader areas and in longer time, for this study only covered the commercial mangoes in the month of November.

Appendix A**Raw Data**

Variety	Fruit flies	Pulp weevil	Seed weevil	None
Carabao	23	1	1	0
Indian	12	4	1	2

APPENDIX B

PICTORIALS



Plate 1. Mango fruits right after sampling



Plate 2. Mango fruits after 13 days



Plate 3. Dissection



Plate 4. Dissected mango

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