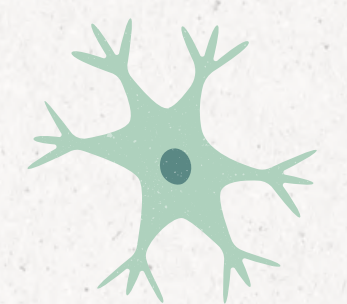




*Lissachatina fulica* (giant African snail) and its Relation to *Erwinia mallotivora*'s infection of the *Carica papaya* (papaya) on the island of Guam



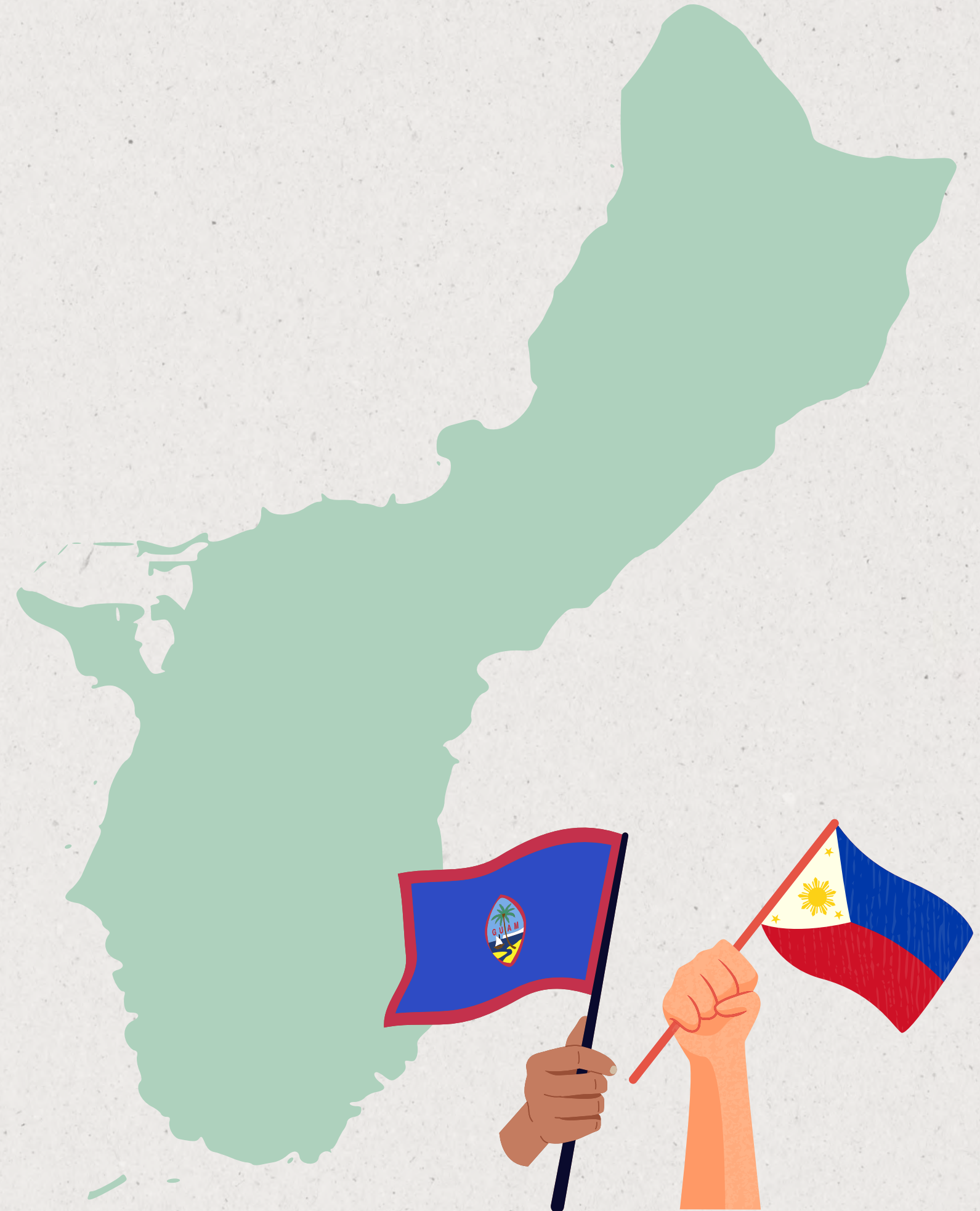
Isaiah Moreno  
Dr. Glenn Dulla, Ph.D., UoG  
University of Hawai'i at Manoa



# Håfa Adai!

## A few things about myself:

- I am Isaiah Moreno and I am 17 years old.
- I am from the small, pacific island of Guam!
- Guam's population is roughly 170,000.
- I am originally from the Philippines, but I've lived in Guam for nearly my entire life.



# Introduction

## What are *Lissachatina fulica*?

- Commonly known as Giant African Snails, *L. fulica* are a species of large land snails native to the east of Africa. They are a highly invasive in the Island of Guam and the rest of the world.



Source: Corry's

## What are *Carica Papaya*?

- Commonly referred as the papaya, they are a very popular and widely grown fruit found in the tropical areas of the world.

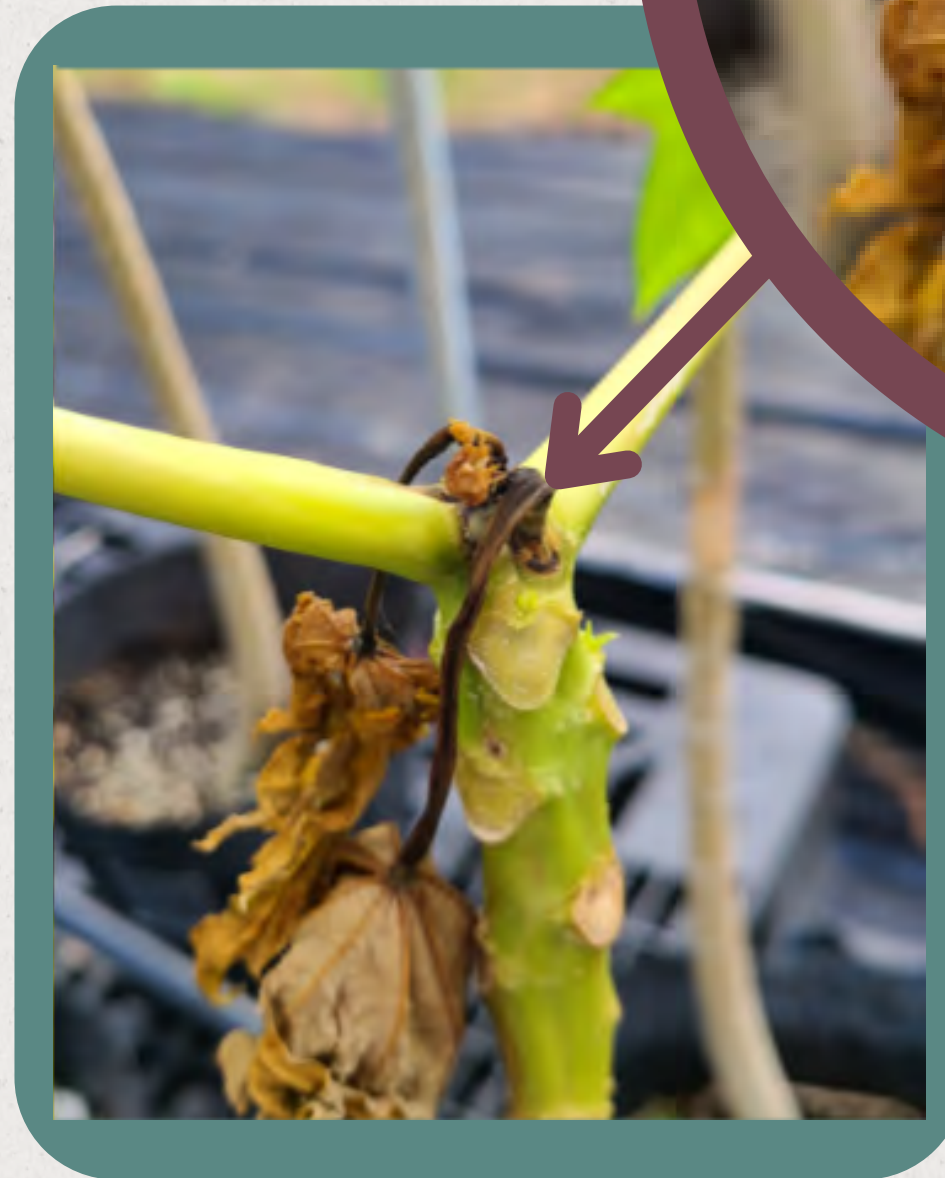


Source: Vendita Piccoli Frutti

# Introduction (cont.)

## What is *Erwinia mallotivora*?

- A papaya plant pathogen that is classified in the *Enterobacteriaceae* family and causes severe damage to occur on the plant, such as **water-soaked lesions on leaves**, **water-soaked cankers on stems**, and the eventual death of the plant.



Source: Julia Delorme, UoG

# Identifying the *E. mallotivora* Pathogen

## Characteristics of the Pathogen

- Isolated, *E. mallotivora* colonies are round in shape, off-white in color, and a shiny, smooth surface.

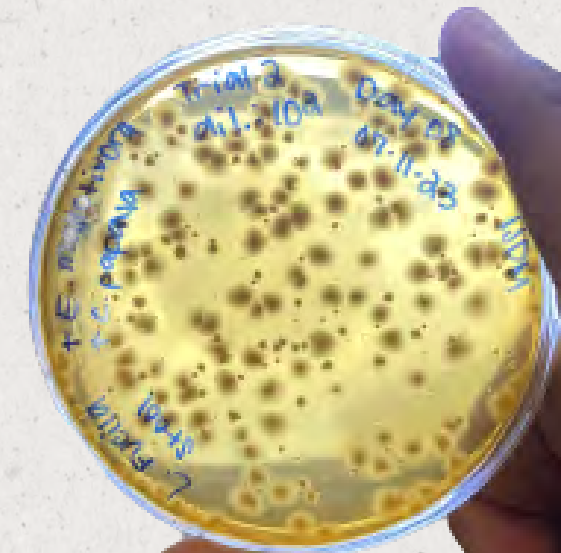
Under the Microscope:



Source: Isaiah Moreno



Source: Zyrhese Santos, JFKHS



# Materials

- Isolated *E. mallotivora* strain
- *C. papaya* fruit
- Inoculated *C. papaya*
- Pipettor
- Distilled water
- 70% ethanol
- Nutrient broth
- Nutrient Agar
- Rifampicin Antibiotic
- Cycloheximide Fungicide
- Petri Dishes
- Sterile Mason Jars
- Autoclave

- *L. fulica* excrement samples
- Microcentrifuge tubes
- Pestle for microcentrifuge tubes
- Centrifuge
- Incubator
- Petri dish spreader
- Sterile cotton swabs
- Inoculation loop
- Scalpel
- Dissecting scissors
- Tweezers
- Dissection microscope
- Sterile containers for *L. fulica*

# Hypothesis & Objectives

## Hypothesis:

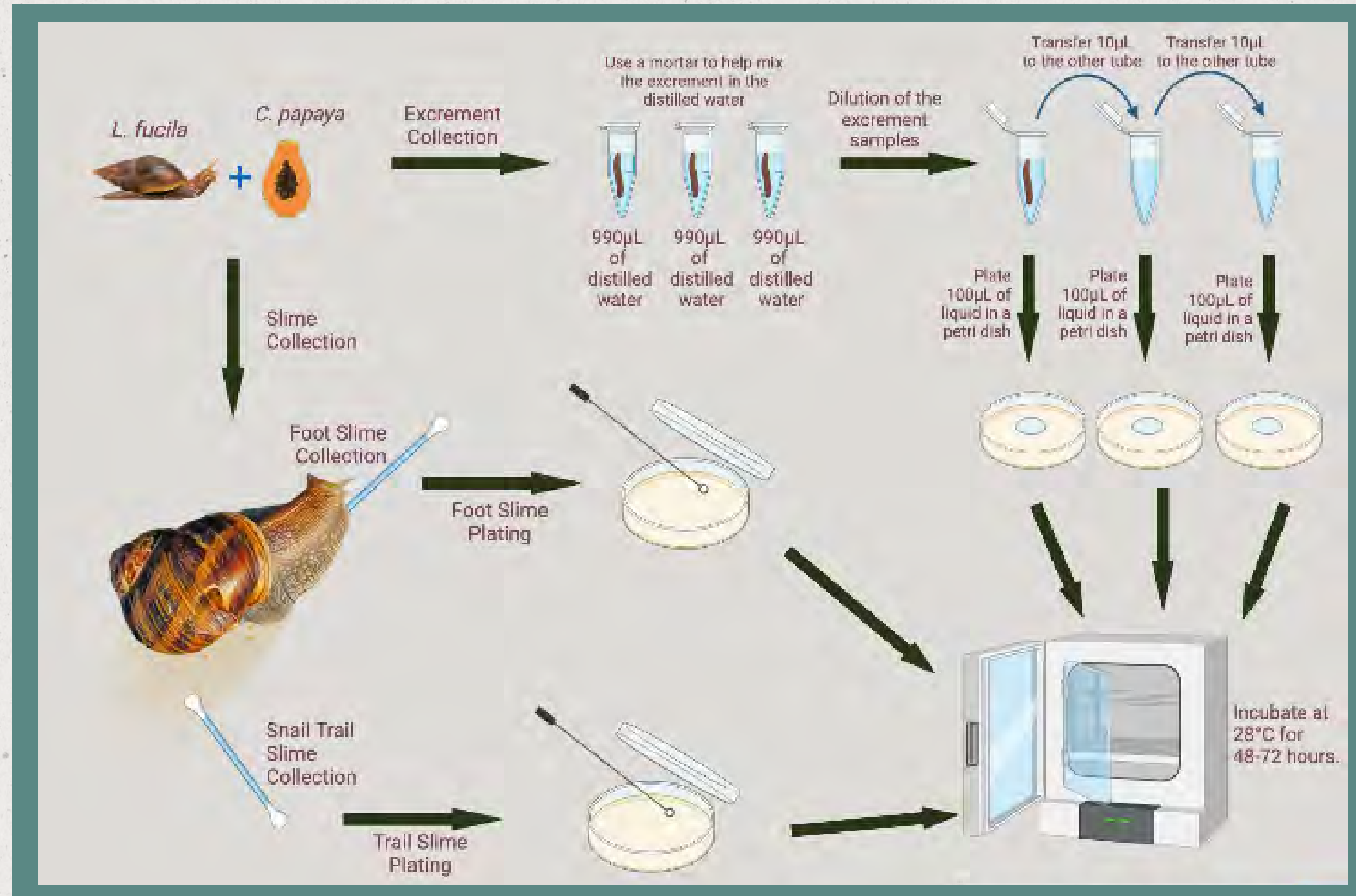
- I hypothesize that *L. fulica* has the ability to spread the pathogen, *E. mallotivora*, through its mucopolysaccharide and excrement and will be a persistent pathogen infection in the vector.

## Objectives:

- To determine whether *L. fulica* is a vector for *E. mallotivora* through its excrement and/or mucopolysaccharide.
- To determine if the pathogen is persistent or transient in the vector.
- To identify how long the pathogen stays in the vector.

# Procedures

## Excrement & Mucopolysaccharide Collection & Plating

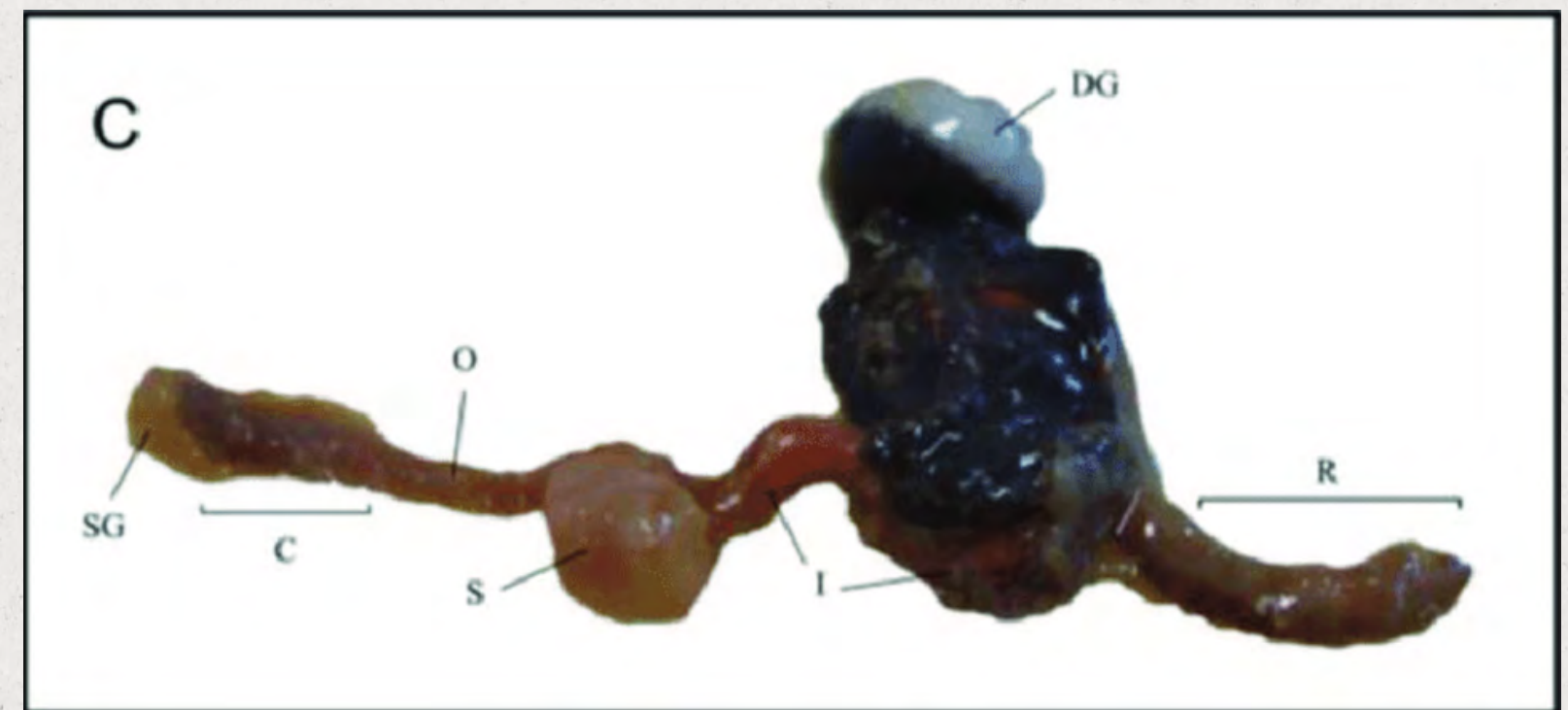


# Procedures (cont.)



## Dissecting & Plating *L. fulica*

- *L. fulica* was placed in a jar filled with water for 24 hours. Then, the dissection process would occur.

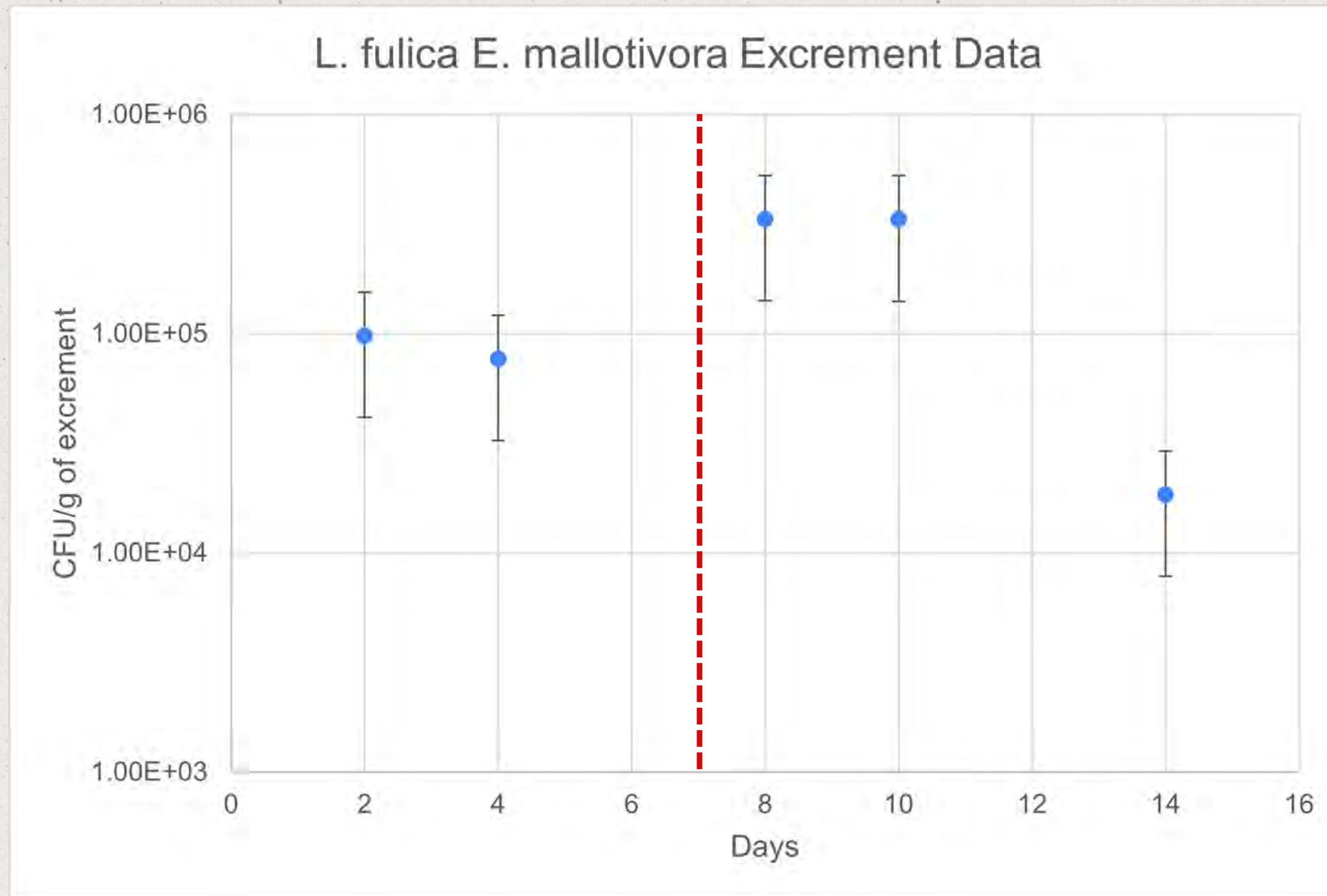


**Source:** Alexander M. Cardoso, Janina JV Cavalcante, Maurico Cantão, Ana Tereza R Vasconcelos.

# Dissection Process Video



# Results of the Study



**\*\*Day 7 - Removal of the Inoculated Papayas\*\***

# Results (cont.)

- *L. fulica* did spread *E. mallotivora* through its excrement throughout the entire study. However, the number of *E. mallotivora* colonies **fluctuated** throughout the study and drastically declined towards the last day of the study.
- Even after the removal of the inoculated papayas on the 7th day of the study, **the pathogen was still present in the digestive tract for the first round of dissection** and the excrement plating.
- However, that was not the case for **the second set of dissection** because the pathogen was not present.
- As for the mucopolysaccharide, the only day where the pathogen was present was on the **2nd day of the study and was not present throughout the rest of the study.**
- Thus, from my results, *E. mallotivora* is a **persistent pathogen infection in *L. fulica*.**

# Conclusion & Discussion

## Conclusion:

- *L. fulica* is a vector for the *E. mallotivora* pathogen through its **excrement**. However, not through its mucopolysaccharide.
- *E. mallotivora* is a **persistent pathogen infection in *L. fulica***
- From the results of the study, the pathogen remained in its excrement for 2 weeks, however it **drastically declined as it reached the day 14 mark**.

## Discussion:

- The results of this study could be used to develop different strategies for combating *L. fulica*'s spread of the *E. mallotivora* papaya pathogen locally.
- Moreover, the possible strategies that would be developed will positively affect the local farmers of papaya plants and lower Guam's reliance on exported goods.

# Acknowledgments

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- Dr. Glenn Dulla, PhD (Mentor)
- Zyrhese Santos, JFK High School (STEP-UP Intern)

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**THANK  
YOU!**

Questions? Comments?