



FUNGAL ENDOPHYTES OF TEN COMMONLY GROWN CROPS IN THE MARSHALL ISLANDS



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INTRODUCTION

- Crop production is very limited in the Marshall Islands due to some environmental challenges. Most people are very dependent on imported foods. This is a major issue in food security because reliance on imported foods has proven to correlate with high incidence of non-communicable diseases like heart disease, diabetes and its complications.
- Fungal endophytes are a mixed population of microorganisms that live within plant roots and leaves but do not cause any symptoms of disease.
- The presence of endophytes has been linked to improved crop yield and increased potential to fight the effects of drought, salinity, and the presence of pests and diseases which are the most common problems of farmers in the Marshall Islands.



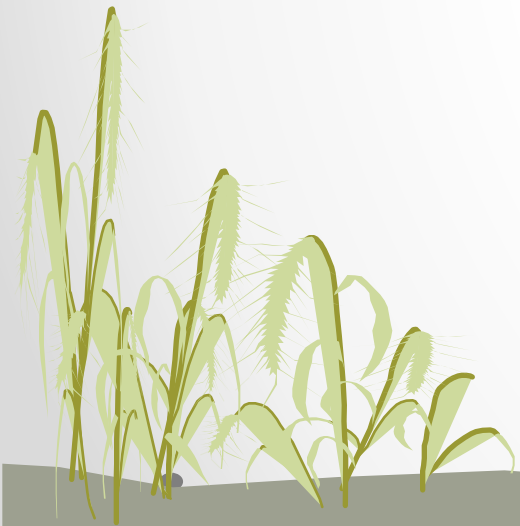
SIGNIFICANCE OF STUDY

- The study aimed to assess the endophytic diversity in five traditional fruit trees and five commonly grown annual crops.
- Information about diversity of fungal endophytes on each plant will help to explain resiliency and stability.
- Isolated fungal endophyte could serve as natural pesticide or biocontrol agent that might be utilized in the future.



HYPOTHESIS

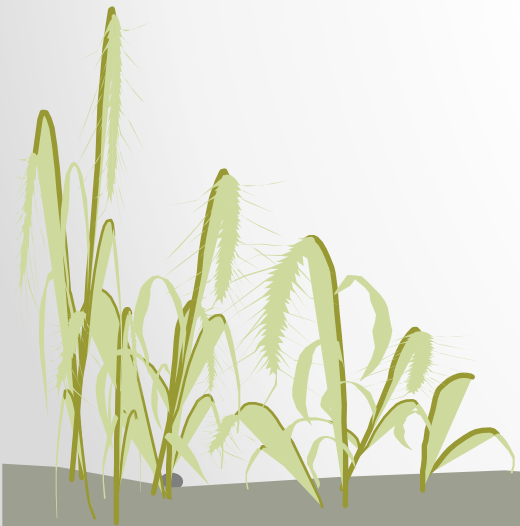
- Population of endophytes is assumed to be higher on older plants like trees that have been standing on the ground for more than five years compared to annual plants like vegetables that are mostly less than 3 months old.
- It was hypothesized that diversity would be higher on older plants.



OBJECTIVES OF THE STUDY

This study aims to fulfill the following objectives:

1. To isolate fungal endophyte on five tree species and five annual vegetable and root crops.
2. To initially identify fungal endophytes in terms of colony morphology and microscopic observation.
3. To compare diversity of each plant



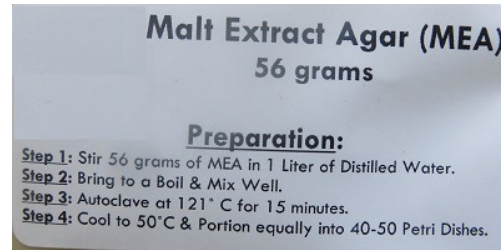
METHODOLOGY

Media Preparation

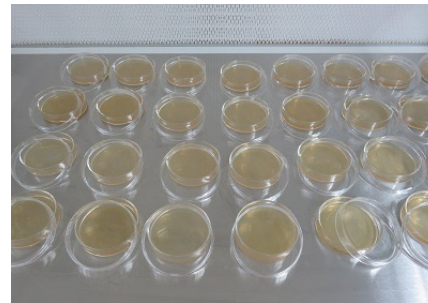
1. Sterilizing petri plates



2. Malt Extract Agar (MEA)



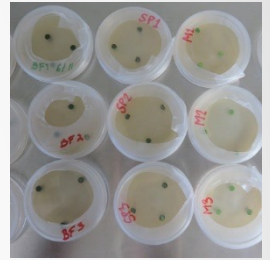
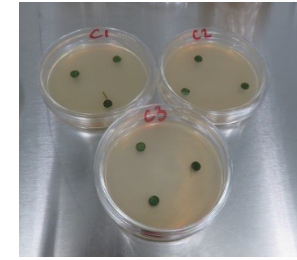
3. MEA plates



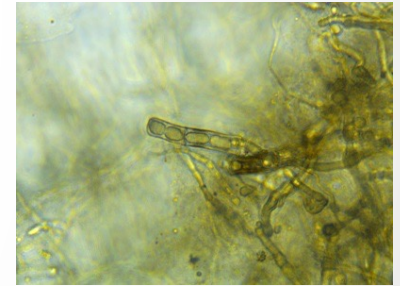
METHODOLOGY

Isolation of fungal endophytes from leaves

1. Leaf collection, sterilization inoculation, and incubation



2. Isolation & identification



3. Data gathering & analysis



RESULTS AND DISCUSSION

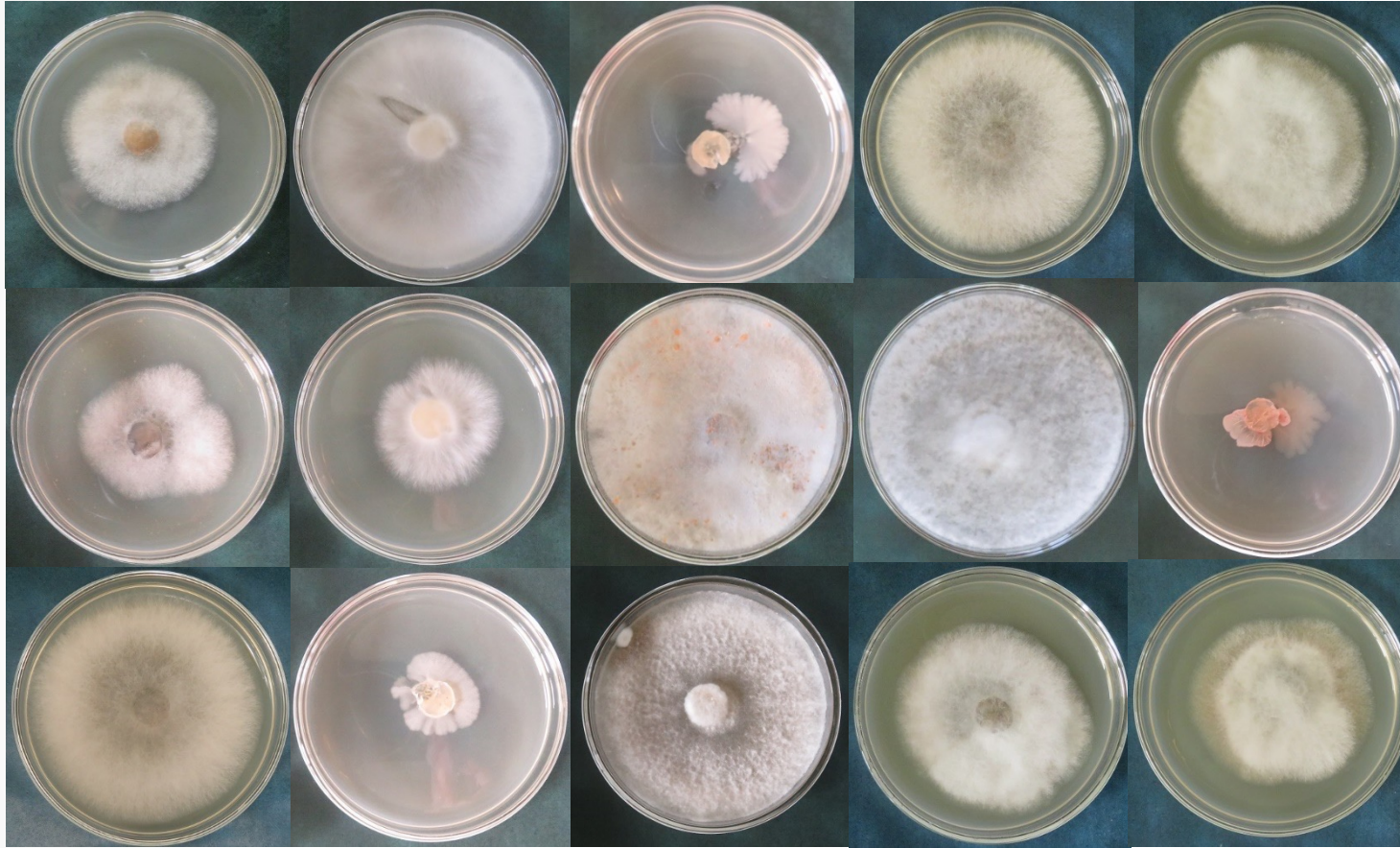
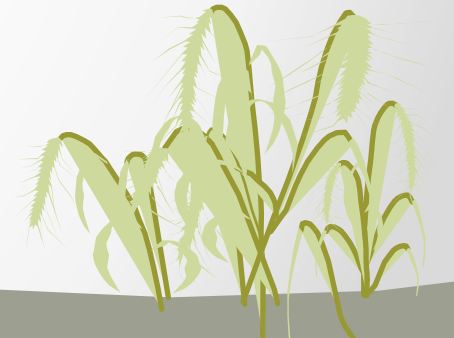
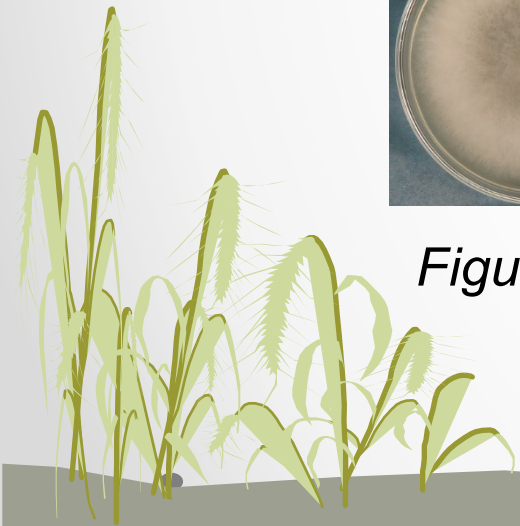


Figure 1. Colony morphology of endophytes on Malt Extract Agar plates



RESULTS AND DISCUSSION

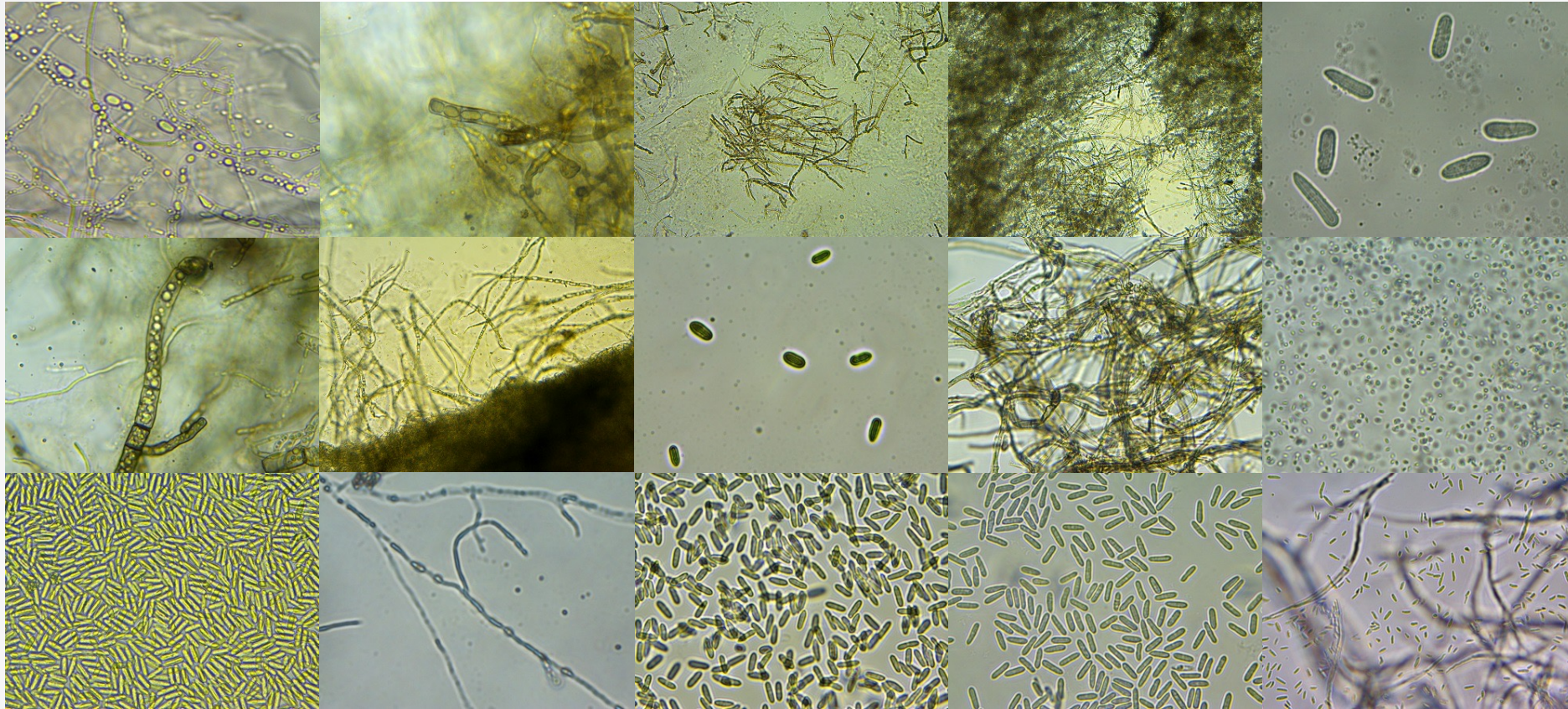
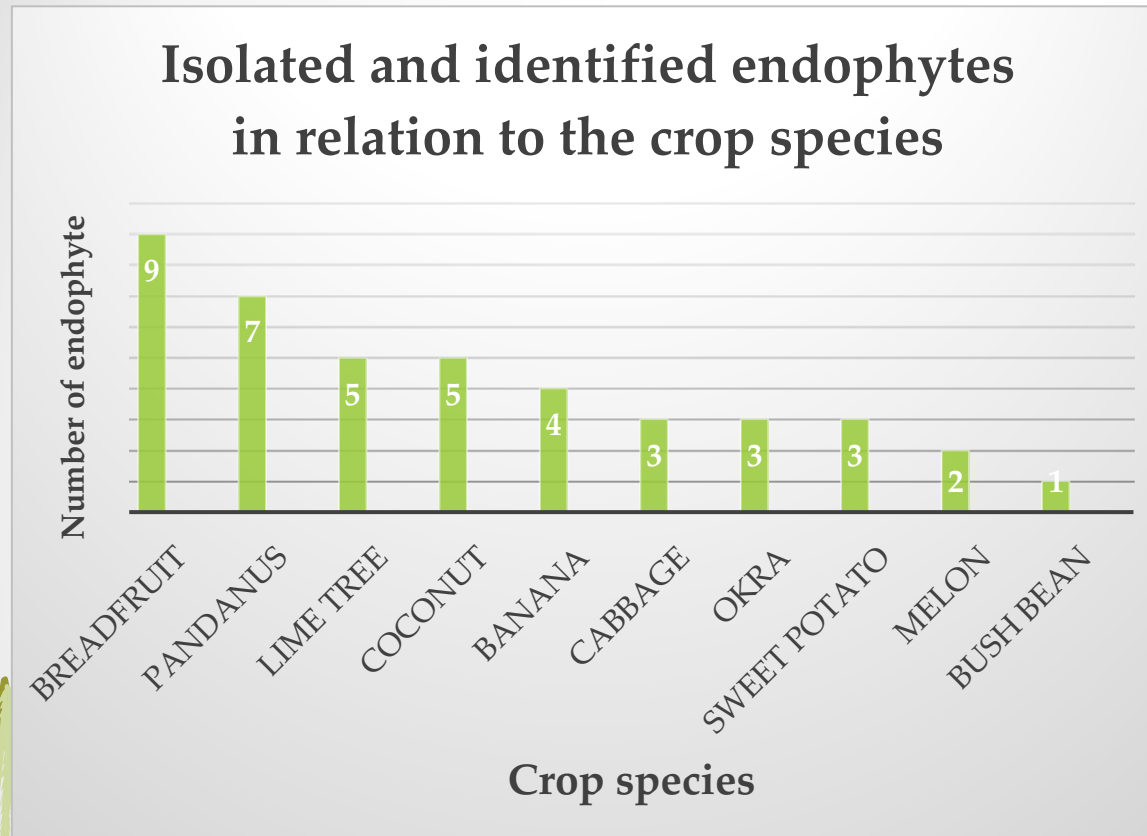


Figure 2. Microscopic appearance (60-100x magnification) of endophytes extracted from MEA plates

RESULTS AND DISCUSSION



As noted fruit tree crops have higher infection incidence compared to vegetable crops. The older and the longer the leaves are exposed in the environment, the higher the abundance of endophytes. This confirms studies of tropical foliar fungal endophytes before (Arnold, 2008; Herre et al., 2005; Cannon & Simmons, 2002; Pamphile & Azevedo, 2002)

SUMMARY and CONCLUSION

- Results suggest the higher diversity found in older leaves as it was hypothesized.
- It was also noted that these traditional fruit trees are the most resilient in the island.
- Further study can be employed on the use endophytes as natural pesticides for crop protection.



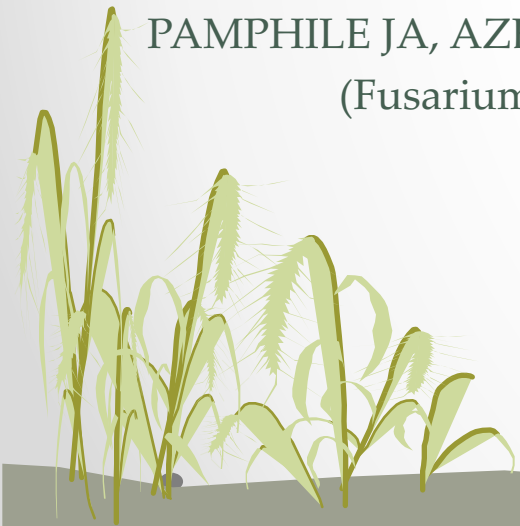
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Kommol Tata