

GEOGRAPHIC DISTRIBUTION AND VEGETATIVE COMPATIBILITY GROUPING ANALYSIS OF *Fusarium oxysporum* f.sp. *cubense* ISOLATED FROM BANANA GROWING AREAS IN LUZON AND VISAYAS

**Alyssa M. de Castro^{*}, Alora Pamela M. Pozon, Teresita U. Dalisay, and
Fe M. Dela Cueva**

**Grand Regal Hotel, Davao City
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INTRODUCTION

Fusarium oxysporum f.sp. *cubense*

- One of the most devastating pathogens of banana
- Commonly disseminated by the introduction of infected planting materials (Perez-Vicente and Dita, 2014)



40X

INTRODUCTION

Fusarium wilt of Banana

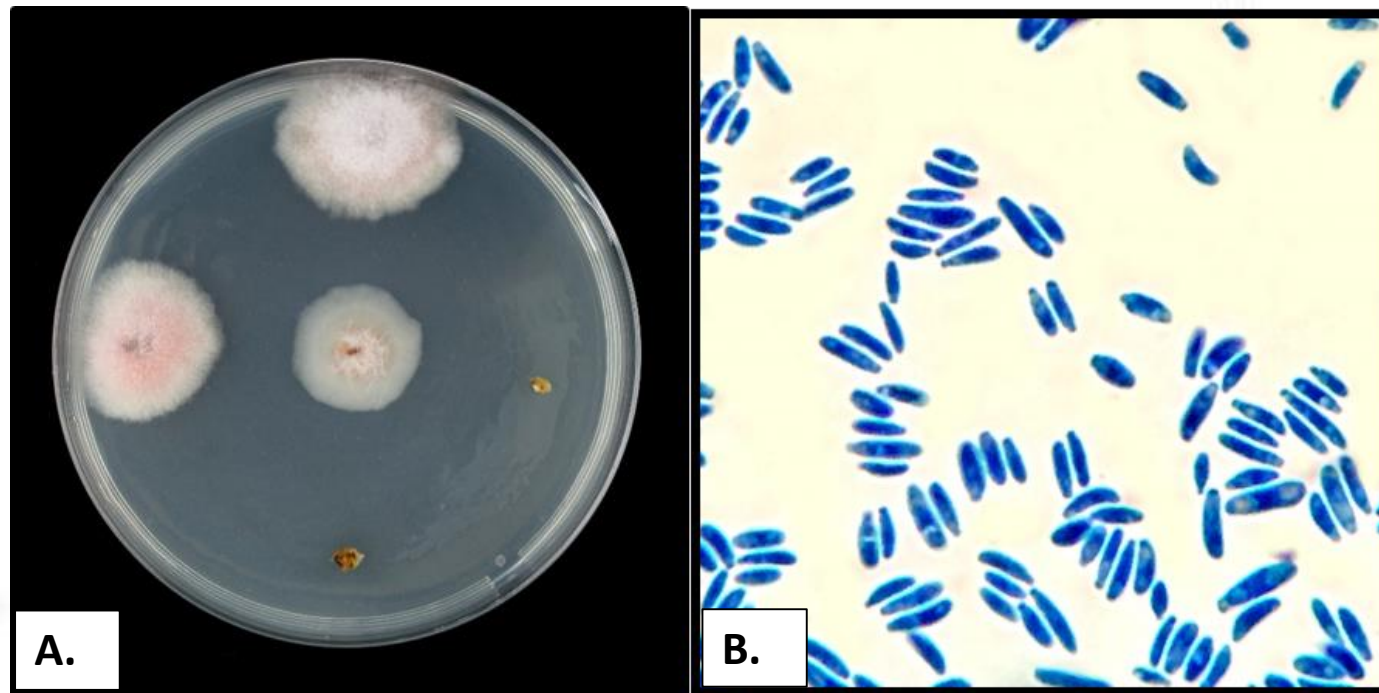


Figure 1. *Fusarium oxysporum* f.sp. *cubense*: (A.) Foc colony in PDA and (B.) Microconidia

INTRODUCTION



INTRODUCTION

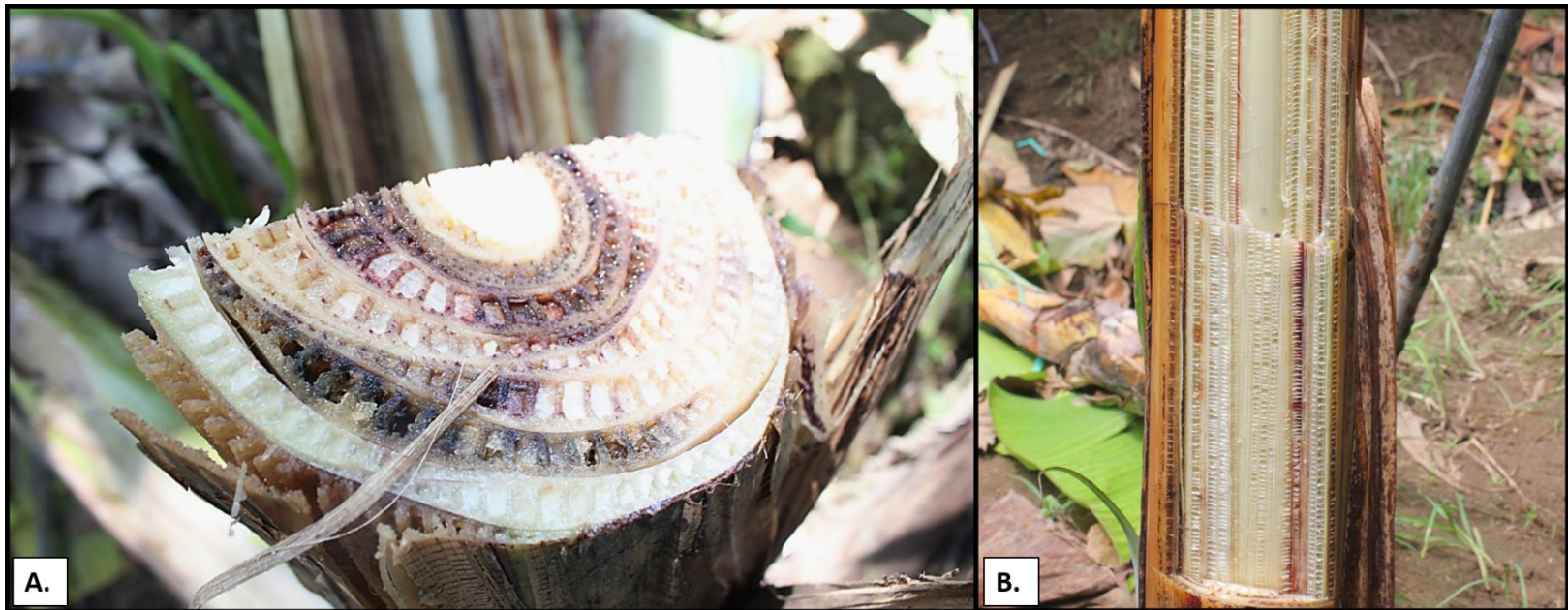


Figure 2. *Fusarium oxysporum* f.sp. *cubense*: (A.) Infected banana pseudostem and (B.) Discoloration on the vascular bundles.

INTRODUCTION

Fusarium wilt of Banana

- Has been reported on banana growing areas in the Philippines, specifically in Mindanao
- Reported to be devastating Cavendish plantations of sweet bananas in the highlands of Mindanao (Molina, et al., 2008)



INTRODUCTION

Fusarium wilt of Banana

- Not much attention was given on the distribution of the pathogen in the Philippines
 - lack of information on the genetic diversity of the Philippine isolates of *Foc*



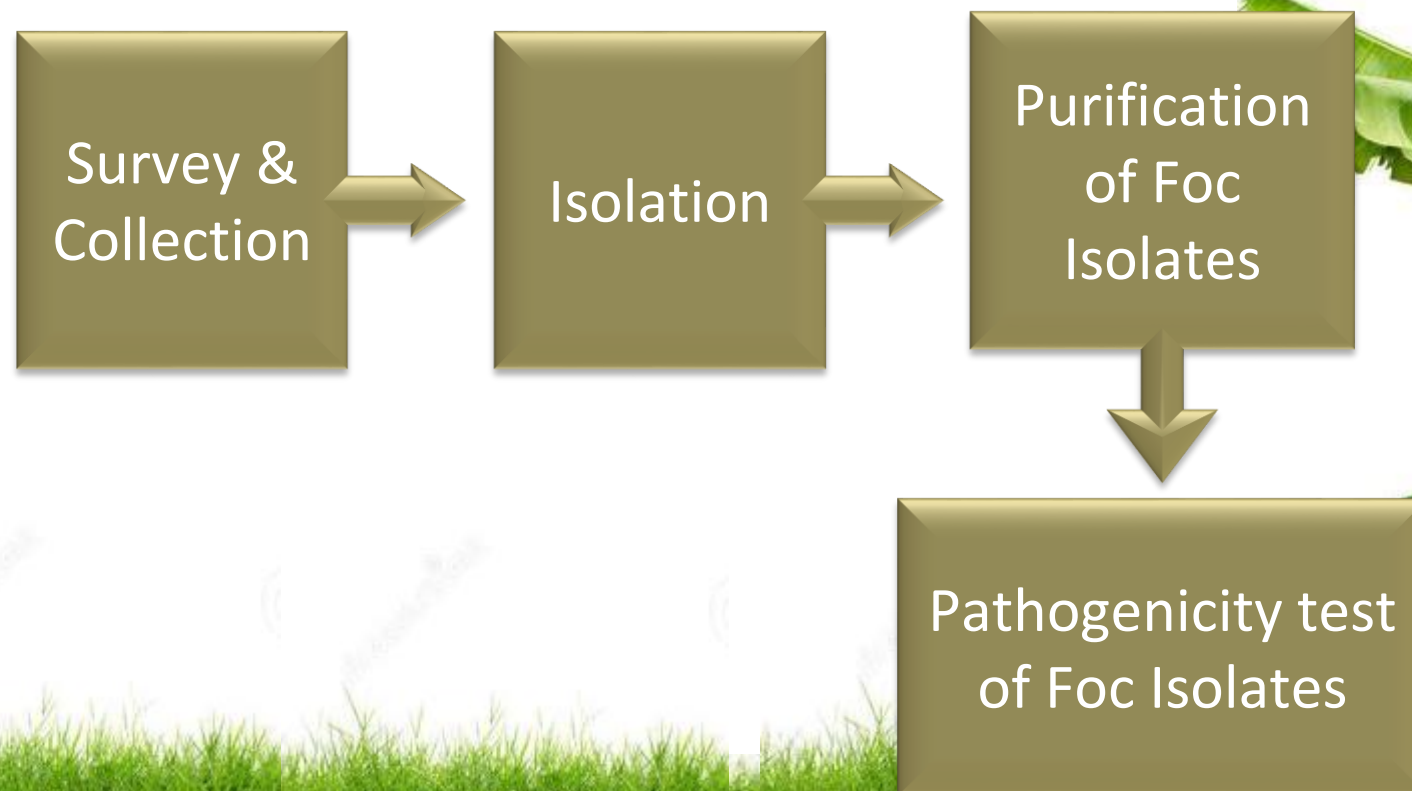
OBJECTIVES

- To determine the geographic distribution of *Fusarium* wilt in banana growing areas in Luzon and Visayas
- To identify races of the collected *Foc* isolates using vegetative compatibility grouping analysis



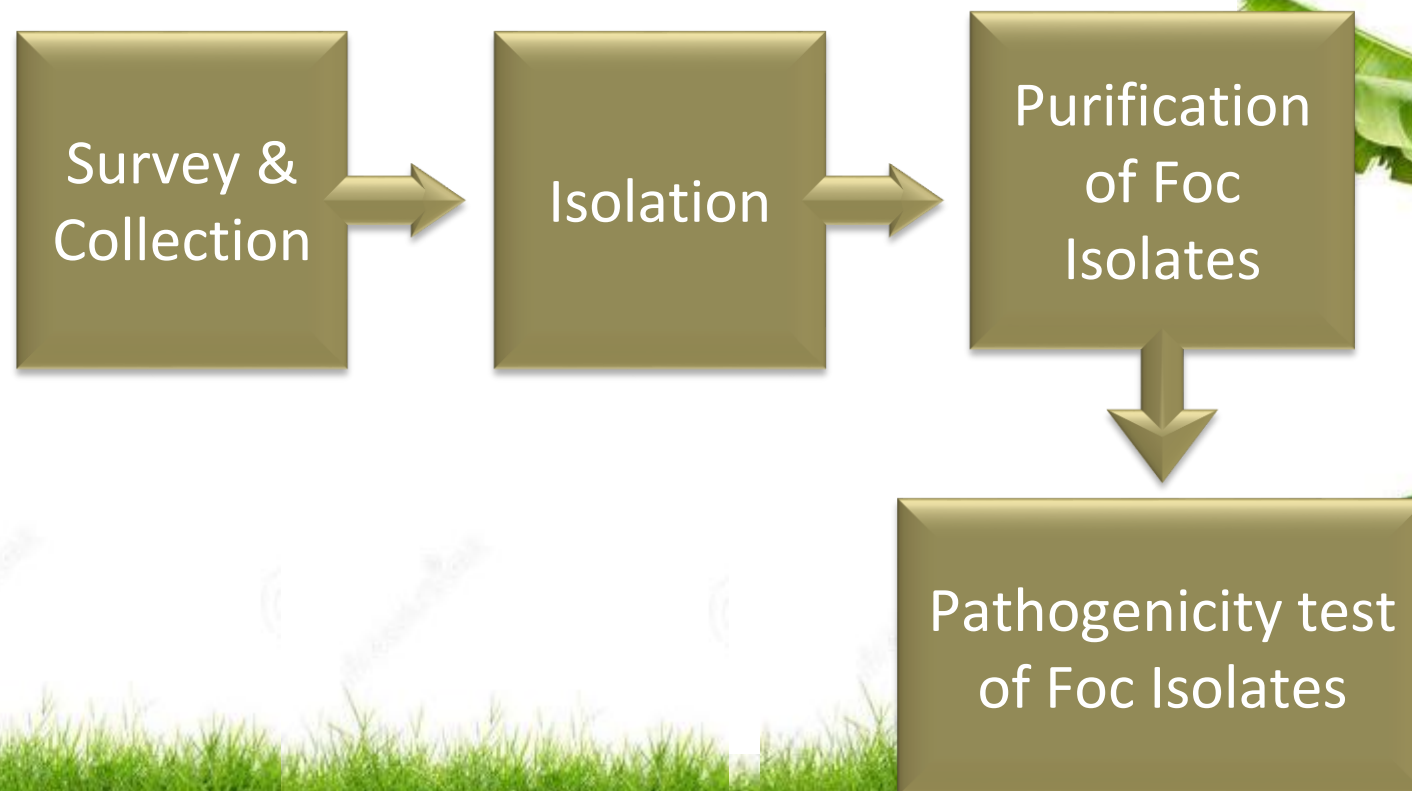
METHODOLOGY

- Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates



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RESULTS AND DISCUSSION

Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates

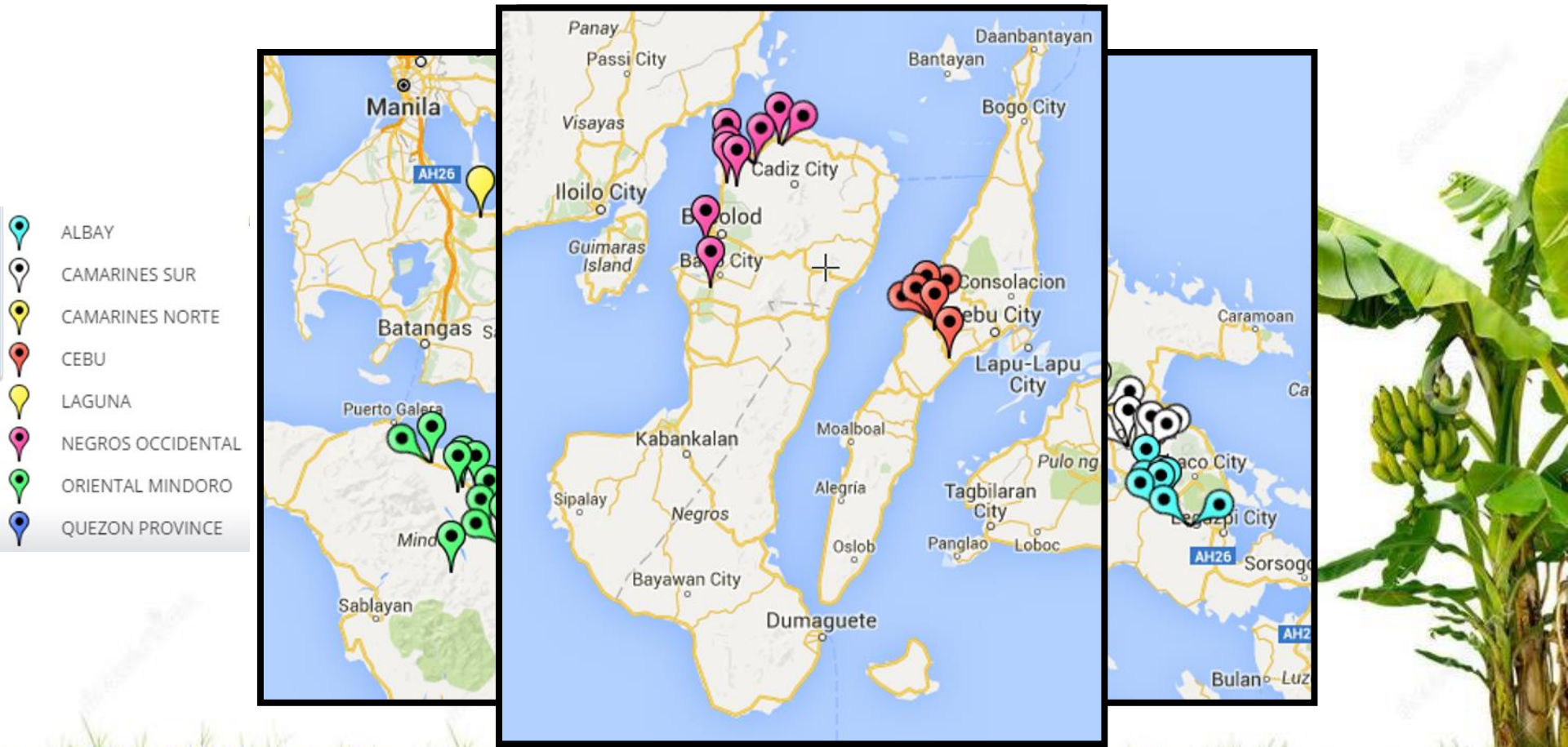
Province / Region	Number of Plants Collected
Laguna	3
Quezon	10
Oriental Mindoro	20
Bicol Region	29
Cebu	6
Negros Occidental	20

TOTAL : 88



Geographic distribution and vegetative compatibility grouping analysis of *Fusarium oxysporum* f.sp. *cubense* isolated from banana growing areas in Luzon and Visayas

Foc Distribution Map



RESULTS AND DISCUSSION

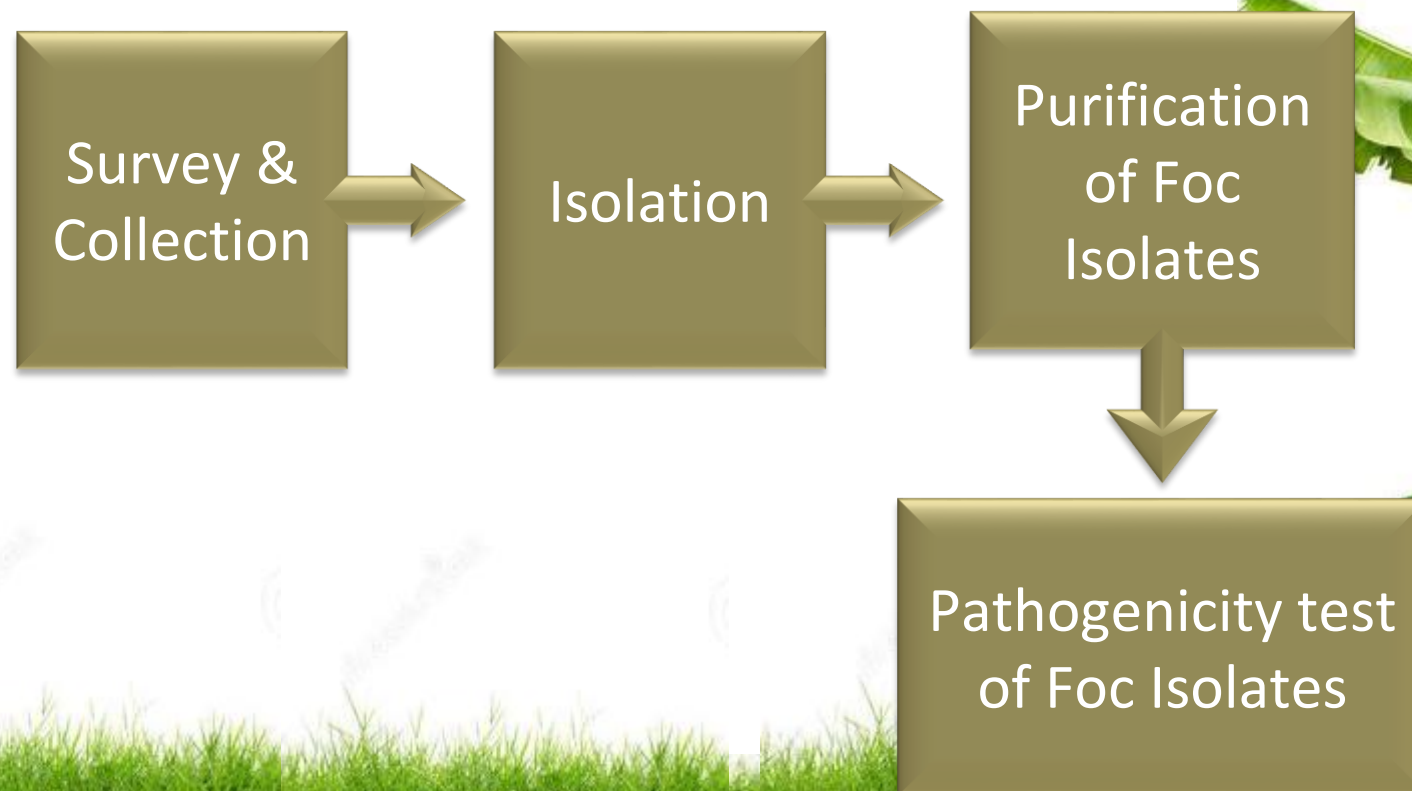
Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates



Figure 3. Symptoms of *Fusarium* wilt. (A.) Skirting and yellowing of mature leaves, and (B. & C.) Red streaks/strands found on the pseudostem.

METHODOLOGY

- Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates



RESULTS AND DISCUSSION

Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates

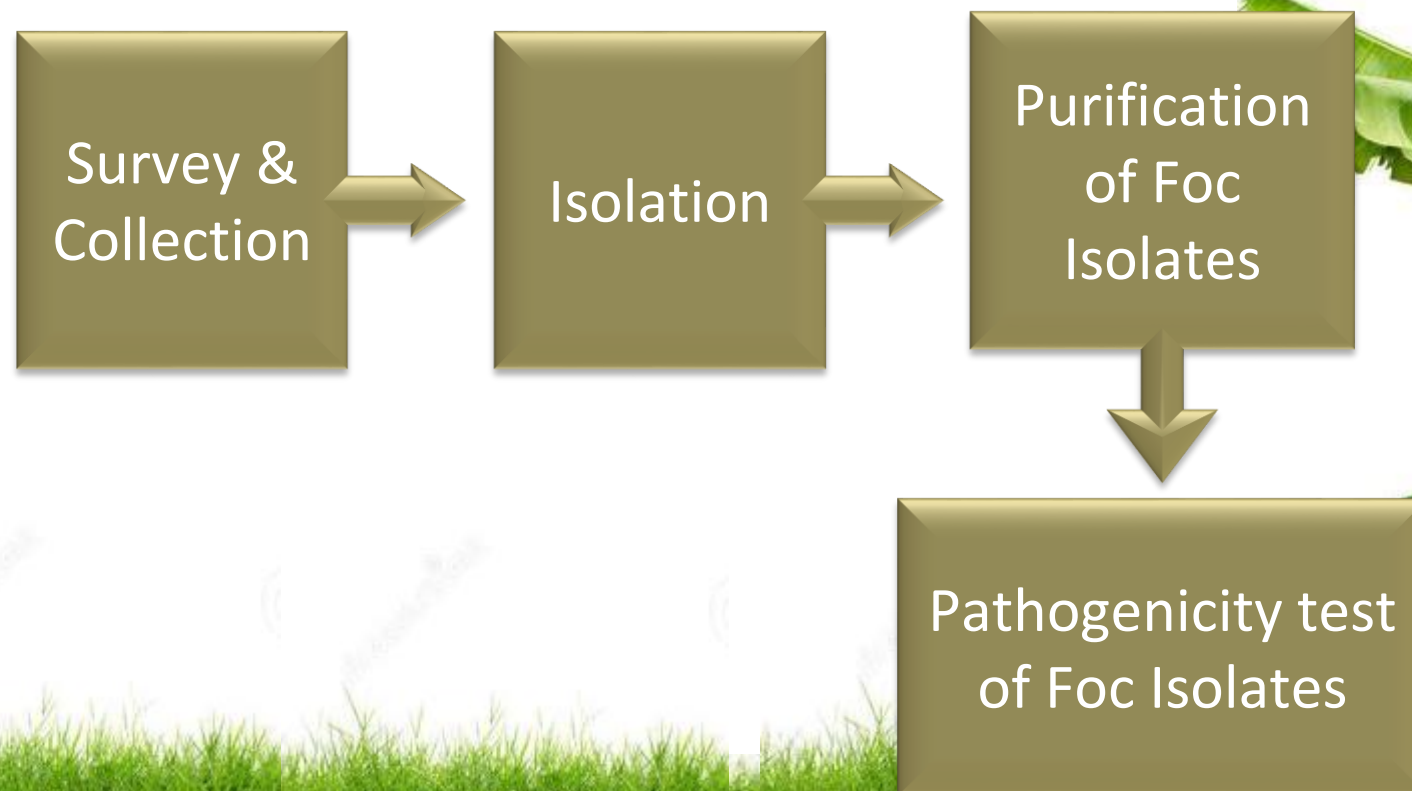
Province / Region	Number of Isolate
Laguna	14
Quezon	27
Mindoro Oriental	50
Bicol Region	104
Cebu	26
Negros Occidental	38

TOTAL ISOLATES : 259



METHODOLOGY

- Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates



RESULTS AND DISCUSSION

Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates

TOTAL NO. OF ISOLATES	NO. OF ISOLATES CAUSING INFECTION 7-11 DAYS AFTER INOCLATION (DAI)	PLANT DEATH/ WILTING
35	27	10-16 DAI



RESULTS AND DISCUSSION

Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates



Figure 4. Infected Lakatan plantlet: (A.) Yellowing of the lower leaves, and (B) Infected stem tissues.

RESULTS AND DISCUSSION

Survey, collection, culture and, pathogenicity test of *Fusarium oxysporum* f.sp. *cubense* isolates

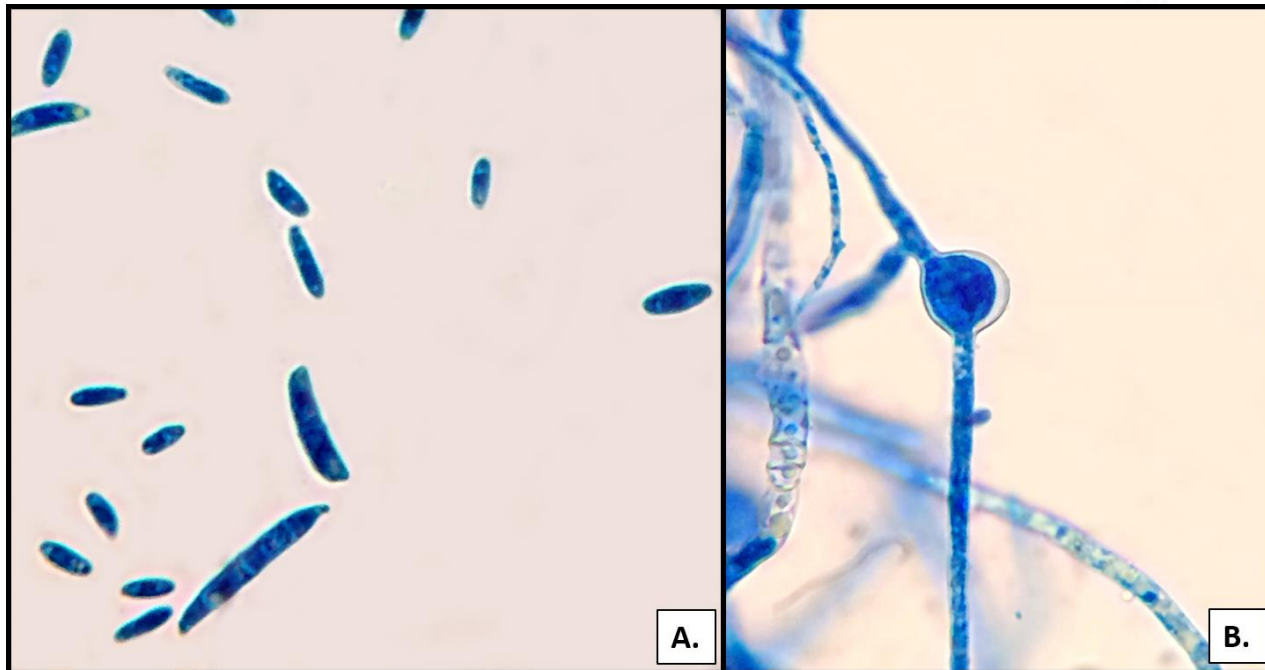
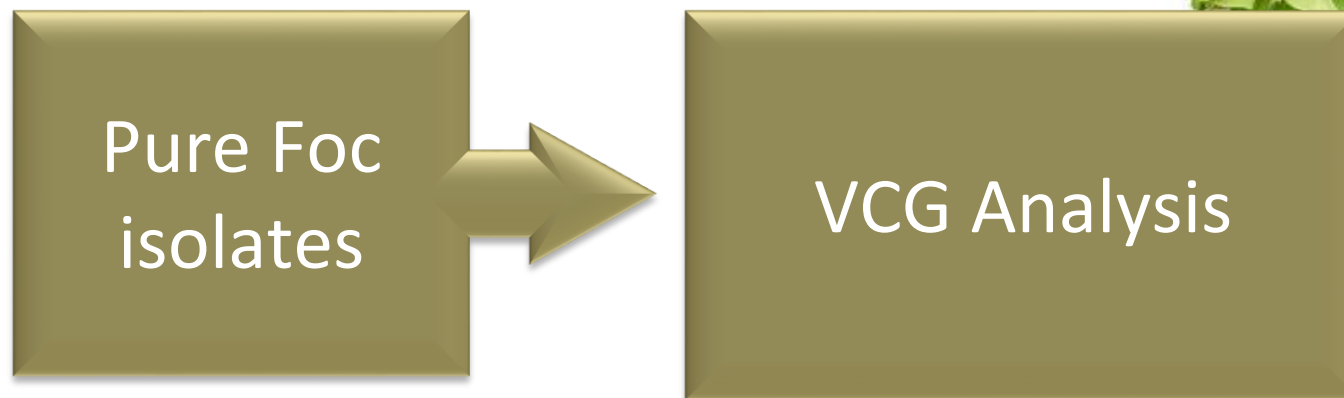


Figure 5. Fruiting bodies of *Foc*: (A.) Macro- and microconidia, and (B.) Chlamydospore.



METHODOLOGY

- Genetic diversity analysis of Foc strains Vegetative Compatibility Group (VCG) Analysis



VCG ANALYSIS



Figure 5. Foc isolate plated on KPS medium.



VCG ANALYSIS

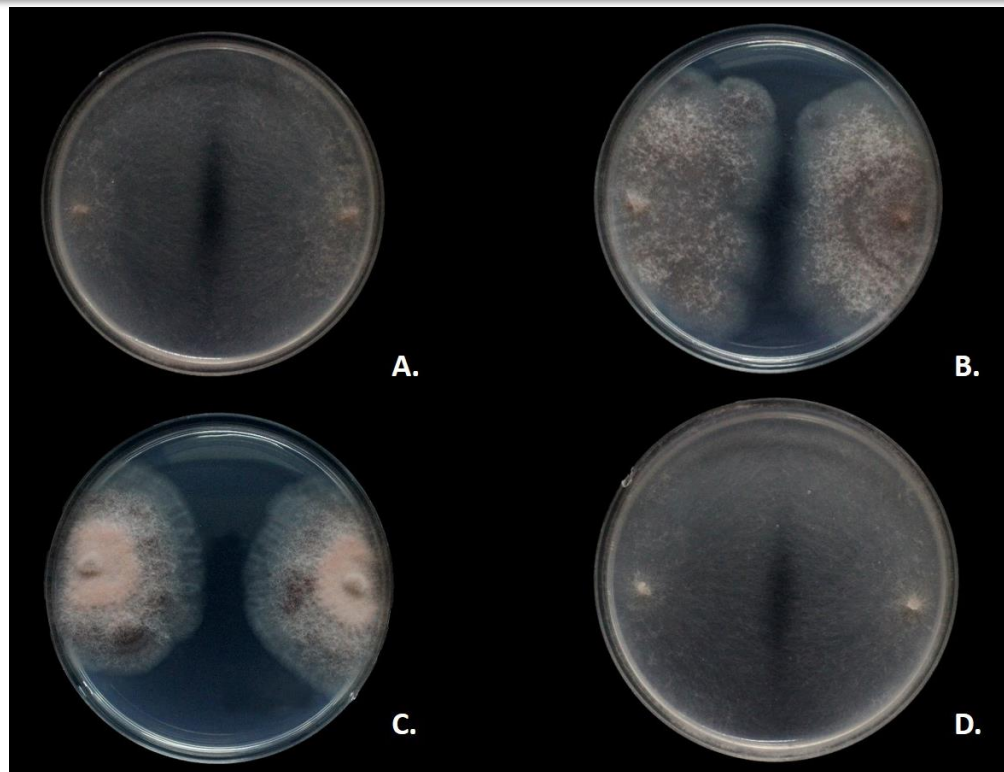


Figure 6. 0123 nit 1 plated on different VCG media: (A.) NM medium, (B.) HM medium, (C.) AM medium, and (D.) UM medium.



VCG ANALYSIS

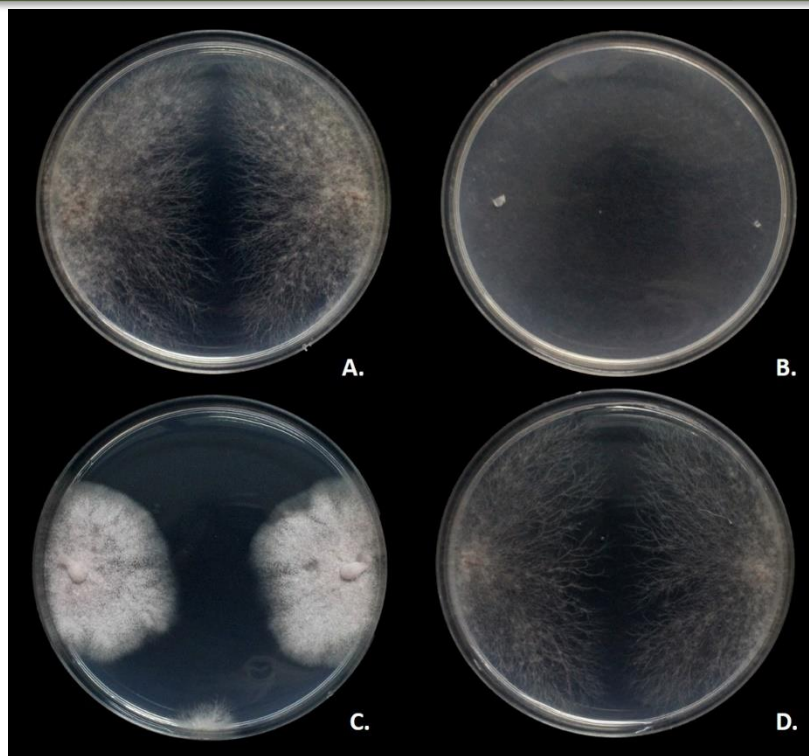


Figure 7. 0123 nit m plated on different VCG media: (A.) NM medium, (B.) HM medium, (C.) AM medium, and (D.) UM medium.



VCG ANALYSIS

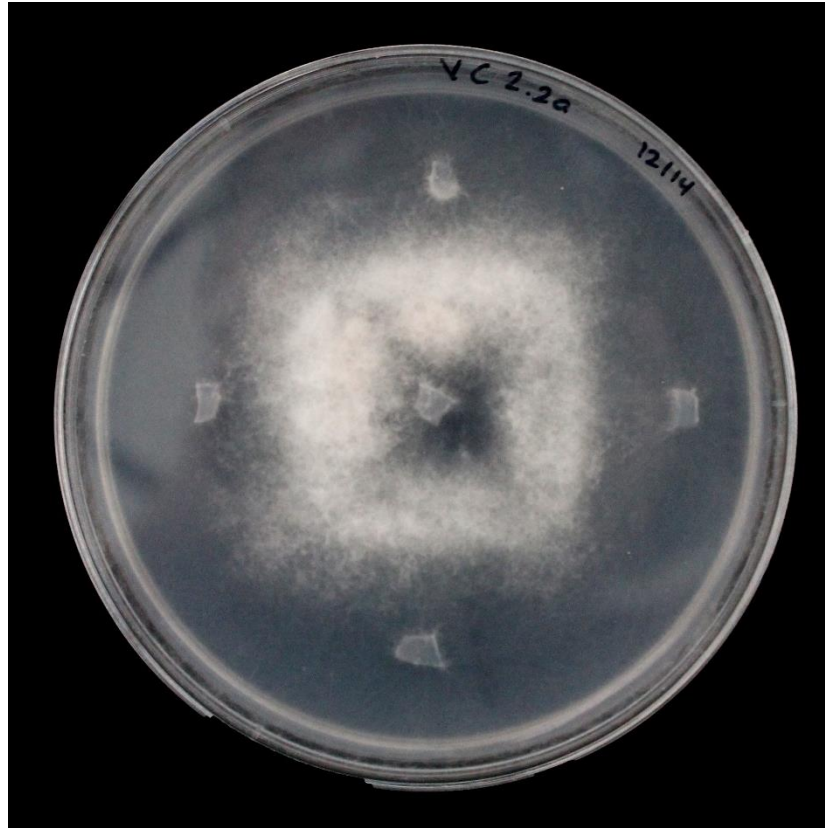


Figure 8. Formation of heterokaryon.



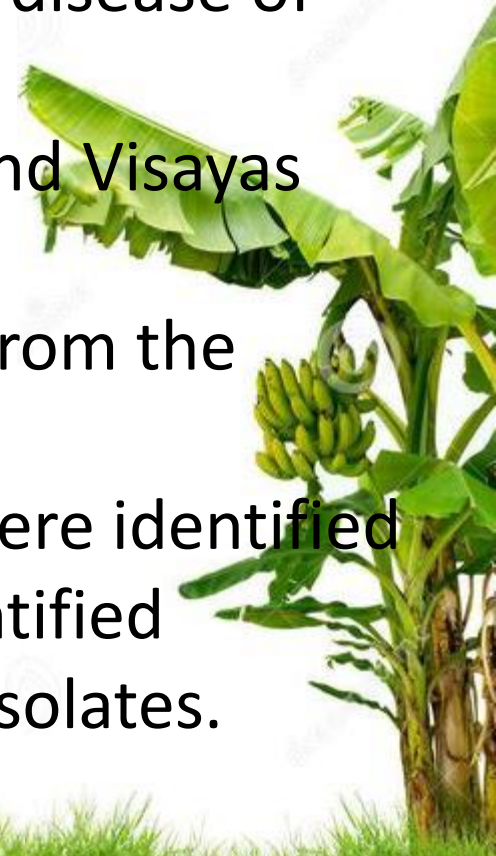
RESULTS AND DISCUSSION

Genetic diversity analysis of Foc strains Vegetative Compatibility Group (VCG) Analysis

CODE	PROVINCE	VARIETY	VCG Group	Race
VC 2.2a	Cebu	Latundan	0123	1
VC 2.2b	Cebu	Latundan	0123	1
VC 4.3b	Cebu	Latundan	0123	1
VC 5.2a	Cebu	Latundan	0123	1
VB 5A.2a	Albay	Lagkitan	0123	1
VB 14.2a	Camarines Sur	Latundan	0123	1
VB 24.1a	Camarines Norte	Lagkitan	0123	1
VB 24.2a	Camarines Norte	Lagkitan	0123	1
VB 25.2a	Camarines Norte	Latundan	0123	1
VB 26.1b	Camarines Norte	Latundan	0123	1
VB 26.2a	Camarines Norte	Latundan	0123	1

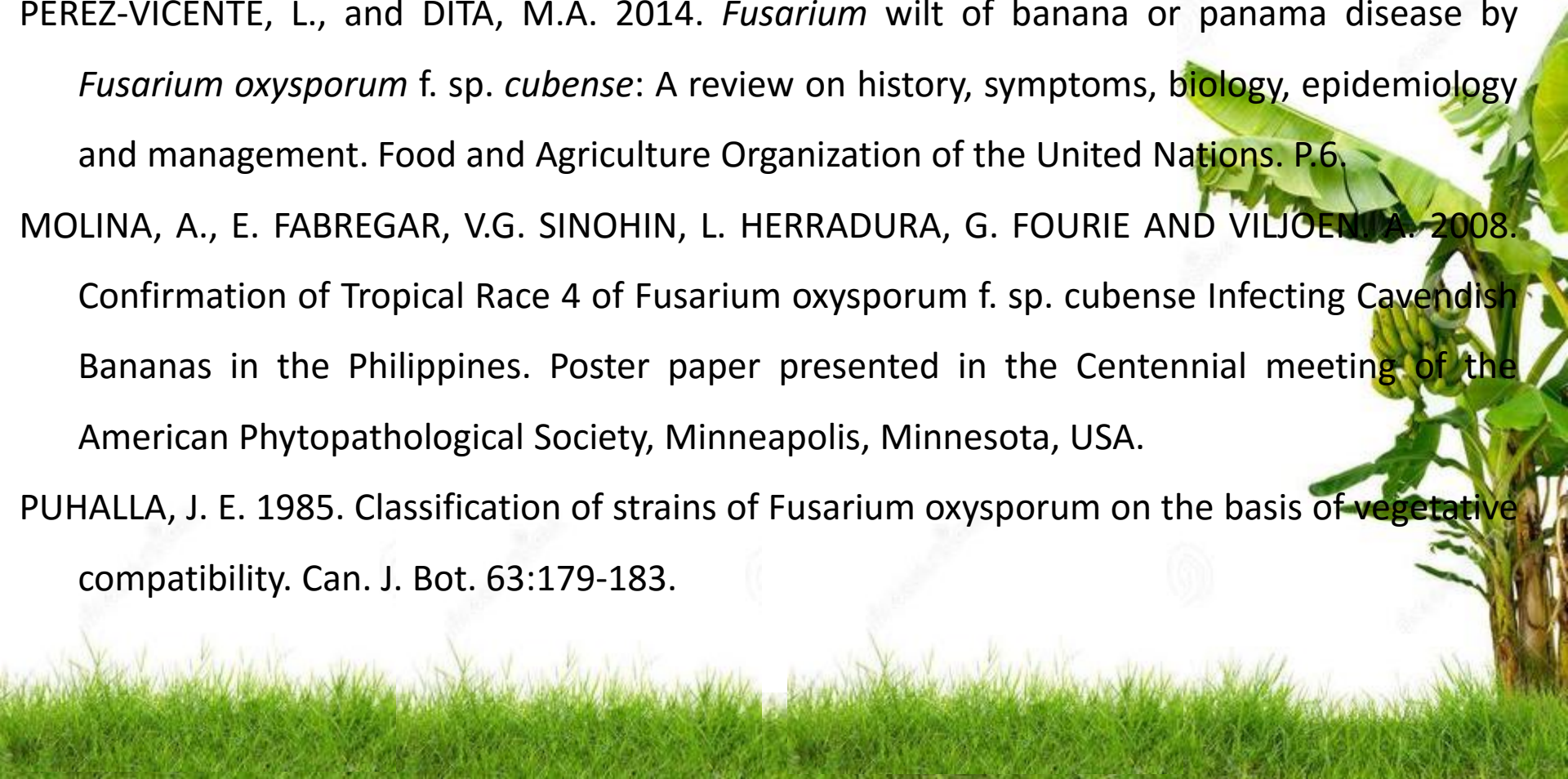
SUMMARY AND CONCLUSION

- *Fusarium* wilt is an economically important disease of banana
- Different banana growing areas of Luzon and Visayas were surveyed
- A total of 259 field isolates were obtained from the collected diseased banana strands
- Among the 26 Cebu isolates, 4 VCG 0123 were identified while in Bicol region, 8 VCG 0123 were identified
- FocTR4 was not identified from any of the isolates.



LITERATURE CITED

- PEREZ-VICENTE, L., and DITA, M.A. 2014. *Fusarium* wilt of banana or panama disease by *Fusarium oxysporum* f. sp. *cubense*: A review on history, symptoms, biology, epidemiology and management. Food and Agriculture Organization of the United Nations. P.6.
- MOLINA, A., E. FABREGAR, V.G. SINOHIN, L. HERRADURA, G. FOURIE AND VILJOEN, A. 2008. Confirmation of Tropical Race 4 of *Fusarium oxysporum* f. sp. *cubense* Infecting Cavendish Bananas in the Philippines. Poster paper presented in the Centennial meeting of the American Phytopathological Society, Minneapolis, Minnesota, USA.
- PUHALLA, J. E. 1985. Classification of strains of *Fusarium oxysporum* on the basis of vegetative compatibility. Can. J. Bot. 63:179-183.



A close-up photograph of a green plant stem and leaves, with a black horizontal band across the middle containing the text 'THANK YOU!' in white.

THANK YOU!