

EFFICACY OF BOOT SCRAPERS AND DISINFESTANTS IN DRY AND WET CONDITIONS IN MANAGING *FUSARIUM* WILT OF BANANAS

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Introduction

Philippines

- Total hectares: 82,000 ha
- > US\$700 million export
- 320,000 direct employment
- 70% big plantations, 30% small growers
- Small growers are most affected by severe epidemics
- 3,000 ha abandoned, 6,000 ha affected in varying levels (Molina et al, 2010)



Problem

- Movement of *Foc* infected soil within and across farms
- Poor sanitation and process of disinfestation
- No published study assessing the disinfestant efficacy when used together with boot scrapers in the field setting



Objectives

- Determined the most effective boot scraper in removing soil from infected boots
- Tested the efficacy of disinfestants against *Foc* TR4 spores in dry and wet conditions
 - Major D (Benzalkonium chloride)
 - Formo (2,2-Dibromo-3-nitrilopropionamide)
 - Chlorox (Sodium hypochlorite)

Materials and Methods

Different boot scraper designs



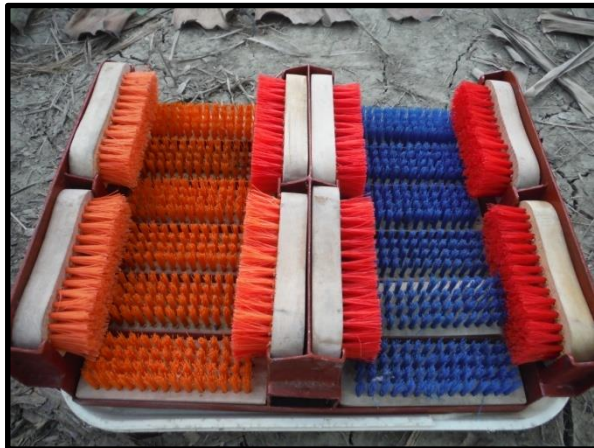
Wire mesh



Bottle cap



Rubber



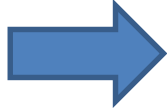
Brush



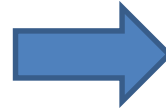
Coco coir

Assessment of different boot scrubs in removing soil

Participants walked in a *Foc* -infected area for 3 minutes



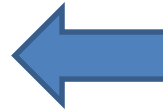
Weighing of boots after walking



Scrubbing of boots for 30 seconds after weighing



Collection of *Foc* infected soil sample



Weighing of collected *Foc* infected soil

Evaluation of the recommended disinfestants against *Foc*

I. FIELD SETTING



Preparation of Boots



Boots infection

Boot scrubbing

Infected boots were scrubbed using meshwire as the most effective scraper



Treatment



Soil sampling

Evaluation of the recommended disinfestants against *Foc*

II. Laboratory Set-up

Processing of Soil Sample

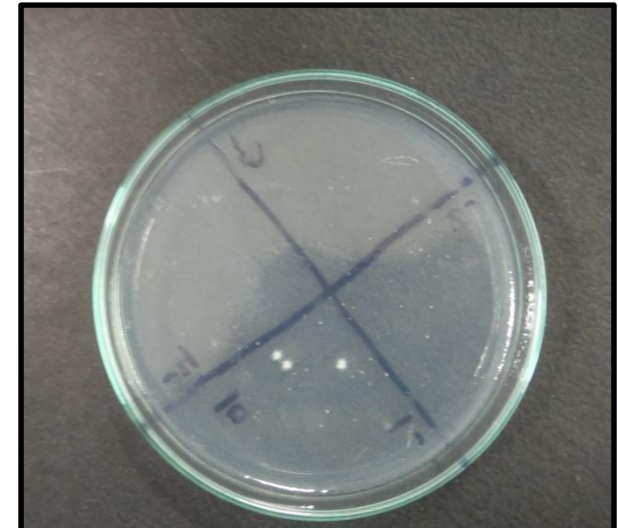
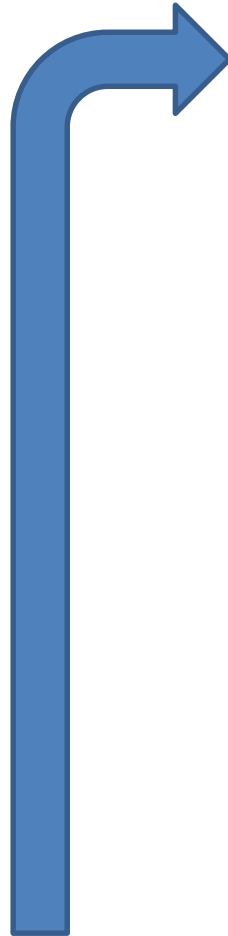
1 gram soil sample was placed in test tube w/ sterile distilled H₂O, and serially diluted 4x.



Starting with the lowest dilution, 10 µl of each dilution were placed in Komada's Medium



Incubate for three days



Count colony forming Unit



Data Analysis

Data in the field and laboratory experiments were analysed using ANOVA and Tukey's Honestly Significant Test

Results

Obj. 1. Determine the most effective boot scraper in removing soil from infected boots

Boots Scraper	Amount of soil removed in grams	
	Dry Condition	Wet Condition
Mesh wire	.35 ^a	10.8 ^a
Brush	.17 ^a	8.4 ^a
Bottle caps	.12 ^b	7.5 ^a
Rubber	.08 ^b	4.2 ^a
Coco coir	.04 ^b	1.0 ^b

Obj. 2. Test the efficacy of disinfestants against *Foc* TR4 spores in dry and wet conditions

***Foc* colony forming units (cfu)/gram of soil treated with disinfestants**

A. Dry Condition

	Water	Major D			Formo			Chlorox	
Concentration		2%	3%	4%	9%	4.5%	18%	4.7%	9.4%
	15930 ^a	6249 ^b	6028 ^b	5517 ^b	1938 ^b	1515 ^b	951 ^b	5631 ^b	3360 ^b

B. Wet Condition

	Water	Major D			Formo			Chlorox	
Concentration		2%	3%	4%	9%	4.5%	18%	4.7%	9.4%
	17820 ^a	3265 ^b	3135 ^b	1402 ^b	595 ^b	321 ^b	126 ^b	5457 ^b	3072 ^b

Summary

- *Foc* affected 82,000 ha of banana plantations affecting business & employment
- Poor farm practice contributed to the spread of *Foc* contaminated soil
- No published study on the assessment of efficacy of commonly used disinfestants and boot scrapers against *Foc* of banana

Summary

- Assessed the soil removing capacity of boot scrapers made of: mesh wire, bottle caps, metal, and coco coir
- Test on the efficacy of Formo, Major D, Chlorox was conducted for both dry and wet conditions
- *Foc* infested soil from the boot sole was collected and stored for laboratory experiment
- The collected samples were brought to the PCR Laboratory, USeP – Apokon, Tagum City to determine *Foc* recovery

Summary

- The best performing boot scraper is the material made of mesh wire
- The lowest *Foc* recovery was observed in Formo at 18% concentration for dry and wet condition

Conclusion

- Poor sanitation and disinfestation can contribute to the spread of the pathogen
- The most effective boot scraper in removing soil is the mesh wire design
- The largest reduction of *Foc* spores were observed at 18% Formo both in dry and wet conditions
- Soil removal is critical in the disinfestation process

Recommendations

- Establish the wire mesh boot scraper before and after the footbath set-up (using Formo at 18%) in the banana plantations;
- Determine its effectiveness in reducing *Foc* spores;
- Assess the longevity of the commonly prepared and deposited disinfestants in the footbath of banana plantations

Acknowledgement

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