Country Report: Philippines

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Philippine Banana Production

Area Planted to Banana in the Philippines, hectares

- Cavendish: 85,809 hectares (19%)
- Lakatan: 56,473 hectares (13%)
- Saba: 182,001 hectares (41%)
- Others: 119,087 hectares (27%)

Volume of Banana Produced in the Philippines, mt

- Cavendish: 4,566,907 mt (50%)
- Lakatan: 970,496 mt (11%)
- Saba: 2,627,129 mt (29%)
- Others: 919,397 mt (10%)

Source: Philippine Statistics Authority, 2015
2012

2002- Foc TR4 observed by Molina et al. (2008) in Southern Philippines

2011- Pilipino Banana Growers and Exporters Association, Inc. (PBGEA) seek the assistance of the government

2012 - 635 ha affected by Foc TR4.

Source: Department of Agriculture, 2012
The MBFEA reported almost 6,000 ha affected by FW with 3,000 ha already abandoned.
Status of Distribution of Foc TR4

Total area affected: 15,507 ha in Davao region alone

Source: DAï RFO XI, 2015

Source: Ugay and others, 2016

Project Leader: Virgie P. Ugay, PhD
UPLP (Philippine Landing Campus)
Status of Distribution of Foc TR4

Evaluation of Foc race 1 and TR4 in Luzon and Visayas (in progress)

Source: Dela Cueva and Dalisay. 2016 (Department of Agriculture)
### Impact of Foc TR4

<table>
<thead>
<tr>
<th>Economic Losses</th>
<th>Cost, PhP</th>
<th>Cost, US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost of eradicating totally affected area (per hectare)</td>
<td>420,769</td>
<td>9,057</td>
</tr>
<tr>
<td>Gross revenue lost due to quarantined unproductive hills (per hectare per year)</td>
<td>413,034</td>
<td>8,890</td>
</tr>
<tr>
<td>Net revenue lost due to quarantined unproductive hills (per hectare per year)</td>
<td>127,313</td>
<td>2,740</td>
</tr>
</tbody>
</table>

US Dollar to Philippine Peso Exchange Rate: US$1 = PhP46.46

## Potential Impact of Foc TR4

<table>
<thead>
<tr>
<th>Extrapolated Cumulative Eradication Cost(^1)</th>
<th>PhP 6.0 B</th>
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</thead>
<tbody>
<tr>
<td>Gross revenue lost(^1)</td>
<td>PhP 8.5 B</td>
</tr>
<tr>
<td>Net revenue lost(^1)</td>
<td>PhP 2.6 B</td>
</tr>
<tr>
<td>Losses in gross export earnings if Philippine Cavendish Industry would be wiped out by Foc TR4 (per year)</td>
<td>PhP 20.0 B or US$472M</td>
</tr>
<tr>
<td>Number of persons dependent on Cavendish Industry</td>
<td>330,000</td>
</tr>
</tbody>
</table>

\(^1\) Assuming Fusarium wilt worsen to affect at least ¼ of total Cavendish production area in the country

US Dollar to Philippine Peso Exchange Rate: US$1 = PhP46.46

Reseurches on Foc TR4

Resistant Varieties

• Adaptability Trial of Seven Giant Cavendish Tissue Culture Variant (GCTCV) from the Taiwan Banana Research Institute (TBRI)

• Introduced by Bioversity International to the Philippines (thru BAPNET)
  - GCTCV 105
  - GCTCV 106
  - GCTCV 119
  - GCTCV 215
  - GCTCV 218
  - GCTCV 219
  - GCTCV 247
Resistant Varieties: Field Trial

GCTCV 218

- Average of 4.28% Foc TR4 incidence
- Ave bunch weight: 14.8-22.5 kg
- Days from planting to shooting: 309-361

Source: Herradura and others, 2016.

²Average of eight farms, (1 hectare each planted with 7 somaclones).
GCTCV 219

- Highly resistant to Foc TR4 (almost 100%)
- Ave bunch weight: 7.8-19.8 kg
- Days from planting to shooting: 317-425
- Forms wild fingers, floaters

²Average of eight farms, (1 hectare each planted with 7 somaclones).

Source: Herradura and others, 2016.
GCTCV 218

- 0.1 -2.0% Foc TR4 incidence in ComVal
- 40.9-70.0% Foc TR4 incidence in Davao del Norte
- Ave bunch weight: 23.8-25.0 kg
- Total Soluble Solids: 19.8 ï 24.0 °Brix

³Average of seven sites (one-hectare area each planted with GCTCV 218 and 219)

Source: Herradura and others, 2016.
Resistant Varieties: Semi-commercial scale

GCTCV 219

- 0 - 0.2% Foc TR4 incidence in Davao del Norte and ComVal
- Ave bunch weight: 21.0 kg
- Total Soluble Solids: 21.4 \text{O \textdegree Brix}

3Average of seven sites (one-hectare area each planted with GCTCV 218 and 219)

Source: Herradura and others, 2016.
Resistant Varieties: Out scaling

GCTCV 218 and GCTCV219 planting materials will be distributed to Cavendish growers affected by Foc TR4 in 2017 by the Department of Agriculture.

Source: Department of Agriculture, 2016.
The combination of Vesicular Arbuscular Mycorrhiza (VAM) and *Trichoderma harzianum* reduces Foc TR4 incidence by 73% and consistently gave lowest disease incidence on field-planted Grand Nain.

Actinomycetes, a newly developed mixture of Actinomycetes, ACTICon, is effective as preventive treatment against Foc TR4 and reduces infection and mortality in Cavendish by 60%.

Source: Dionio and others, 2016 and Papa, 2015.
Biological Control

Effect of microbial agents applied singly and in combination on severity of infection of Foc TR4 on Cavendish banana under greenhouse condition.

Source: Dionio and others, 2016.
Biological Control

- Use of suitable cover crop (*Arachis pintoi*) to enhance suppression of Foc TR4 in the soil (in progress)

Other cover crops considered
- *Calapogonium mucunoides* (kudso)
- *Ipomea batatas* (ornamental sweet potato)

Source: Gervacio and others, 2016.
Sanitation

Å Evaluation of different boot scrub design for maximum removal of soil

Wire mesh  Bottle cap  Rubber

Brush  Coco coir

Source: Gervacio and others, 2016.

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Current Disease Management Measures

1. Eradicate Foc TR4 infected plant by hauling

2. Replant GCTCV 218 or 219 immediately (upon availability).

3. Fertilize regularly, preferably at most one month interval.

4. Since GCTCV 219 is highly resistant to Foc TR4, biological control treatment is not necessary. For signs of infection in GCTCV 218, apply Trichoderma harzianum.

Practiced by small scale farmers and contract growers
Other Disease Management Measures

1. Eradicate Foc TR4 infected plant by rice hull burning
2. Disinfect the area before and after eradication.
3. Fence the eradicated site and construct a small canal around the fenced area.
4. Treatment of eradicated site.
5. Planting of resistant banana cultivar

Employed by multinational companies

Source: Lapanday Food Corp., Inc.
Other Disease Management Measures

6. Maintain the fence around the infected area even after replanting operation

7. Disinfect tools and spray the infected sites using the recommended disinfectants

8. Maintain footwear bath in the area and disinfection of vehicle wheels

Employed by multinational companies

Source: Lapanday Food Corp., Inc.
R&D Plans

Â Continue initiatives on the following:

Â Assessment of distribution and race identification of Foc in Luzon and Visayas

Â Evaluation of biological control and sanitation practices (use of cover crop, boot scrub and disinfectant)
Future Areas of Collaboration

Optimize/ Improve management practices for GCTCV 218 and 219 production to address the following:

- Malformation defects/ wild finger formation in GCTCV 219
- Harvesting and post-harvest concerns
- Optimum nutrient requirement to increase yield and improve performance of GCTCV 218 and 219
- Optimum condition for use of biocon
- Advocacy/promotion on the use of GCTCV 218/ 219 to manage and control the spread of Foc TR4
- Conduct of trainings/ symposium on Fusarium wilt
- Policy advocacy studies


References


International Partners

Bapnet

Bioversity International

Taiwan Banana Research Institute

ACIAR

Queensland Government Department of Agriculture and Fisheries

Australian Aid
Thank you very much!
Maraming Salamat po!

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