Cultural practices for Banana bunchy top management:

A sustainable option for Burundian smallholders?

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Introduction: the Burundian context

Burundi:
- located within the Great Lakes Region
- recovering from civil war (1993-2005)
- landlocked (DRC, Rwanda and Tanzania)
- 17 Provinces (800 to >2000 masl)
- high demographic pressure
- reduced arable land availability
- >80% live off agriculture
Introduction: the Burundian context

Banana:

- food security and income-generating crop
- rated by FAO as the most important crop
- intimately linked to social life
- traditionally intercropped in a smallholder setting (<1ha)
- faces various constraints including reduced soil fertility, aged plantations and diseases
- no banana program *per se*
- mixed experience of tissue culture
- Cibitoke = major lowland producing region
Introduction: Bunchy top

Banana bunchy top disease or “BBTD”:

- caused by a nanovirus (BBTV)
- reported in Burundi since 1987
- present within lowland Provinces
- highest incidence in Cibitoke (2008)
- systemic disease
- characteristic symptoms
- reduces yield
- not transmitted by soil or tools
- no cure
- no varietal resistance
Introduction: Bunchy top

Banana bunchy top disease or “BBTD”:

- simplified dispersion

*Pentalonia nigronervosa*

Infected planting material

99% < 86m

> 100m
Introduction: Disease management

- based on exclusion & eradication
- function of local conditions
- strict national program / adapted legislation
- participative rehabilitation promoting use of TC and annual to 2-year production system
- awareness raising and collaborative management based on use of chemicals

What about the burundian small-holder context?
Case study

Selection of 3 sites (Cibitoke Province, BBTD hotspot):

1. Pilot site Munyika (Rugombo Commune, ‘Km5’, 933masl)
2. Mparambo II (Rugombo Commune, ‘Km5’ monocrop control, 933masl)
3. Muyange (Mugina, ‘ligitsiri’ intercrop, 1170masl)
Case study

Data collected:

1. Farmers’ awareness on banana and BBTD
2. BBTD incidence and severity (scale of 0 to 5)
3. Seasonality of winged aphid population (yellow trap)
Case study: Pilot village “Munyika”

Banana bunchy top disease management:

- On-farm trial from December 2009 - December 2010
- Small diagnostic survey on farmer knowledge on banana
- Identification of 19 farmers with neighboring banana plots
- Establishment of a ‘FHIA’ demonstration plot using TC material
- Distribution of 15 plantlets to each pilot farmer
- BBTD management via awareness raising & training on cultural practices

2 Control sites:

No awareness raising
No BBTD management
Farmer awareness of banana production systems

- 2 distinct plantation typologies

<table>
<thead>
<tr>
<th></th>
<th>Household plantations</th>
<th>Plantations &gt;120m</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>&gt;10</td>
<td>3-5</td>
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<tr>
<td>Cropping system</td>
<td>monocrop</td>
<td>intercrop</td>
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<tr>
<td>Main variety</td>
<td>Km5</td>
<td>Km5</td>
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- Locally obtained suckers (<1km) are used as planting materials
- Desuckering is not practiced
- ‘Yangambi Km5’ grown by all farmers representing 95% mats
Farmer awareness of BBTD

• Locally known as “Sindika”
• Familiar with advanced stages of the disease
• Not aware of initial stages of the diseases
• Not aware of the role of *P. nigronervosa*
• Not aware of transmission using infected suckers
• BBTD does not influence the choice of planting location

Not aware of control options

Do not uproot the entire mat when a single plant is sick

1/5 farmers use “positive selection” when selecting suckers
BBTD incidence and severity

- Farmer and site variable
- Monocrop and household plantations have higher incidence
- Possible to reduce BBTD incidence to acceptable levels in 1 year
- Incidence increases once farmers are left to themselves
- Establishing new plantations >80m away reduces incidence

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<tr>
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<th>Km5 Control</th>
<th>Intercrop Control</th>
<th>‘FHIA’</th>
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<tbody>
<tr>
<td>Dec 2009</td>
<td>26</td>
<td>3</td>
<td>31</td>
<td>9</td>
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<tr>
<td>Apr 2010</td>
<td>12</td>
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<td>9</td>
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<tr>
<td>Aug 2010</td>
<td>9</td>
<td>4</td>
<td>28</td>
<td>5</td>
<td>2</td>
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<tr>
<td>Dec 2010</td>
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<td>2</td>
<td>28</td>
<td>4</td>
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<td>Mai 2011</td>
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<td>4</td>
<td>ND</td>
<td>ND</td>
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</tbody>
</table>
Seasonality of aphid populations

- Trial duration: April - November 2010
- Peak captures in April, July and October
- Minimal captures in June and August
- Absence in ‘FHIA’ trial in October and November

1. Flight peak coincides with planting season (October)
2. Km5 & FHIA03 aphid preference
Conclusions

Key for successful management of BBTD:

- Control of planting material movement
- Increased vigilance in non-affected bordering regions
- Awareness-raising and training of all stakeholders
- Regular follow-up of farmers
- Regular scouting of fields by farmers
- Prompt eradication of infected plants/mats
- Supply affordable disease-free plantlets in a timely manner
Perspectives

How to manage BBTD within a:

Small-scale resource-poor farmer
& BXW context?
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Merci