Can plantain banana production be intensified without pesticides?

P. Pugeaux, T. Lescot, R. Achard, S. Dépigny

pauline.pugeaux@cirad.fr
Can plantain banana production be intensified without pesticides?

- Conventional farming
  - Intensive in chemical inputs
  => Around 12 t/ha

- Intercropped
  - Few chemical inputs
  => Between 5 and 18 t/ha

Plantain banana: a staple food crop in Central America and West & Central Africa.
In Ivory coast, a private banana company took up the challenge

Know-how from dessert banana industry

- In vitro plantlets
- Improved fallow
- Irrigation
- Early pruning
- Leaf cutting
**Characterization** of 3 plantain fields side-by-side, planted with a mix of traditional varieties and fertilized with organic and mineral fertilizers.

<table>
<thead>
<tr>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1580 plants/ha</td>
<td>1900 plants/ha</td>
<td>800 plants/ha</td>
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</table>

- **Weevils**: pseudostem traps
- **Nematodes**: fallow + in vitro plantlets
- **Sigatoka**: No treatments
- **Weeds**: manual

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- **Weevils**: pheromone traps
- **Nematodes**: fallow + in vitro plantlets
- **Sigatoka**: Oil treatments
- **Weeds**: manual
Measures and monitoring

- Pests and diseases
- Yields: actual yields + yields per variety
- Activities and associated costs
Preliminary results

Pests and diseases: **Sigatoka**

- **Cavendish: 1300**

Low Sigatoka incidence on both treated and untreated plots
Preliminary results

Pests and diseases: **Nematodes and Weevils**

**Nematodes**: low level 3 months after planting. Monitoring every cycle at flowering.

**Weevils**: low level of population between planting and first harvest.
Preliminary results

Yields

Mean yield (t/ha)

Plot 1

Plot 2

Plot 3

Variety mix
Big Ebanga
Corne bout rond
Ehô
Banadiès

Determination ongoing
Preliminary results

Mean yield (t/ha)

Plot 1: 13 kg/bunch
Plot 2: 5 kg/bunch

Variety mix:
- Big Ebanga
- Corne bout rond
- Ehô
- Banadiès

ongoing
Preliminary results

Yields

Plot 1

Plot 2

Plot 3

Variety mix

Big Ebanga

Corne bout rond

Ehô

Banadiès

Determination ongoing

Mean yield (t/ha)
Preliminary results

Mean yield (t/ha)

Plot 1

Plot 2

Plot 3

Yields

1900 trees/ha

800 trees/ha

Variety mix
Big Ebanga
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Determination ongoing
Preliminary results

Economic analysis: Costs

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<tr>
<th>Costs / ha / first cycle (Thousand CFA F)</th>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
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<tbody>
<tr>
<td>Labour costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable costs</td>
<td>1500</td>
<td>1000</td>
<td>500</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>6000</td>
<td>4000</td>
<td>2000</td>
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Graph showing costs for plots 1, 2, and 3.
Preliminary results

Economic analysis: Costs

Costs / ha / first cycle (Thousand CFA F)

- Labour costs
- Variable costs
- Fixed costs

Plot 1  Plot 2  Plot 3
Labour costs
Variable costs
Fixed costs
Preliminary results

Economic analysis: Costs

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<th>Plot 2</th>
<th>Plot 3</th>
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<tr>
<td>Labour costs</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Fertilization</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Irrigation</td>
<td>6000</td>
<td>4000</td>
<td>2000</td>
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Costs / ha / first cycle (Thousand CFA F)
Economic analysis: Costs

Preliminary results

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<tr>
<td>Fixed costs</td>
<td></td>
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</table>

- Plot 1: Labour costs = 1000, Variable costs = 1500, Fixed costs = 6000
- Plot 2: Labour costs = 500, Variable costs = 1000, Fixed costs = 4000
- Plot 3: Labour costs = 0, Variable costs = 500, Fixed costs = 2000
Economic analysis: Costs

<table>
<thead>
<tr>
<th>Plot</th>
<th>Costs (CFA F per kg)</th>
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<tbody>
<tr>
<td>Plot 1</td>
<td>109</td>
</tr>
<tr>
<td>Plot 2</td>
<td>121</td>
</tr>
<tr>
<td>Plot 3</td>
<td>182</td>
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Variable and labour costs
Discussion and Perspectives

Can plantain banana production be intensified without pesticides?

A room for yield improvement:
- Optimum density for each variety to be determined;
- Selection to obtain more stable and productive cultivars.

Plantain planting materials in Africa, a challenge:
- Quality (sanitary and agronomic);
- Quantities;
- From the chosen variety.

Improving cost-efficiency:
- Reducing production cost: fertilizers, irrigation adjustment, mechanization of weeding...
- Improving selling prices: off season, export...