TOOLS4SEEDSYSTEMS:  
WORKING TOWARDS RESILIENCE THROUGH ROOT, TUBER AND BANANA CROPS IN HUMANITARIAN SETTINGS 

BANANA & PLANTAIN SEED PRODUCTION PRACTICES 

OMONDI BONAVENTURE AMAN • TOOLBOX FOR SEED SYSTEMS VIRTUAL TRAINING • MAY 25, 2023
Musa spp: Banana and Plantain

Banana and Plantain: diversity

- Differences: economical and historical
- Banana and plantain – one crop multiple uses
- Variations in starchiness
- Growth habit – dominance of the main stem
- Fruit characteristics
- Plantains – more lowland forms, (not clear cut)
- Shared cropping methods
- Shared pests and diseases
- Seed systems are mainly informal between farmers
- Formal seed of high multiplication rates; often safer.
Banana propagation

Banana suckers

Corm fragments

Tissue culture propagation and rooting

Hardening nursery
Site selection for seed multiplication

- Sucker mother gardens
  - Soil fertility
  - Pests and disease risk (Soil, vector borne)
  - Access (and security)
  - Security – significant consideration

Hardening Nursery:
- Security
- Accessibility
- Water availability
- Pest and disease risk
- Rooting medium
- Facilities e.g. sterilisation and potting
Selection of varieties and sourcing of seed

• Variety selection:
  • Who will plant? Why? Price
  • Production systems, adaptability
  • Consumption and market price

• Seed sourcing:
  • Availability, trusted source, seed
  • Quality of seed (seed, mother plant)
  • Adaptability (sucker, plantlets?)
  • Quantity and timing
## Planning seed production

**Banana suckers**

**Corm fragment techniques**

**Tissue culture propagation and rooting**

<table>
<thead>
<tr>
<th>Delay</th>
<th>Week - months</th>
<th>Weeks</th>
<th>2 – 3 months</th>
<th>4 – 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proliferation</td>
<td>&lt; 3 – 10 a year</td>
<td>ca 10</td>
<td>10 - 25</td>
<td>&gt;&gt; 1000</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Medium to high</td>
<td>need rooting</td>
<td>need hardening</td>
<td>Low @planting</td>
</tr>
<tr>
<td>Disease risk</td>
<td>High if informal</td>
<td></td>
<td></td>
<td>Low if indexed</td>
</tr>
<tr>
<td>Transport</td>
<td>Low</td>
<td>Medium</td>
<td>medium</td>
<td>Stage dependent</td>
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</tbody>
</table>
Pest and disease management

• Main pests
  • **Banana weevils**: tunnel in the corm limiting nutrient and water flow
  • **Nematodes**: destroy roots
  • Control:
    • Paring to minimise carry over
    • Hot water treatment
    • Trapping

• Main diseases
  • Banana bunchy top disease – virus, seed borne, aphid transmitted
  • Bacterial wilt (mostly in East Africa) – limited vector borne
  • Fusarium wilt (multiple races)
  • Black/ yellow leaf streak (Sigatoka)
Support tools

Training manuals on Macropropagation: Link

Tumaini App: Google Play Store

BBTD training course: https://classes.afrique-learning.com/

Bacterial Wilt training course: crop health courses
## VPC seed systems concerns

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Effect</th>
<th>Tweaks and options</th>
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</thead>
<tbody>
<tr>
<td>Low multiplication rates</td>
<td>Poor timing with the planting season</td>
<td>Mother garden – decapitation, false decapitation</td>
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<tr>
<td></td>
<td></td>
<td>Low tech micropropagation: corm splits/ bucket system</td>
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<tr>
<td>Bulkiness, transportation</td>
<td>Bulkiness, perishability, loss of vigour</td>
<td>Localized acclimatization nurseries (for TC plantlets)</td>
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<td></td>
<td></td>
<td>Sucker local splitting and macropropagation</td>
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<tr>
<td>Packaging and handling</td>
<td>Space and spoilage during transportation</td>
<td>Trimming roots and leaves</td>
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<td>Wet gunny bag packaging (fast rooting necessary)</td>
</tr>
<tr>
<td>Storage: short shelf life</td>
<td>Rapid perishability in storage, loss of vigour during storage</td>
<td>Suckers, high ability to regenerate, cut off leaves</td>
</tr>
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<td></td>
<td></td>
<td>Plantlets: possibility of 2&lt;sup&gt;nd&lt;/sup&gt; bud/ trim leaves, roots</td>
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<td></td>
<td><strong>Planning</strong> – late or early delivery common issue</td>
</tr>
<tr>
<td>Disease and pest transmission</td>
<td>Risk of rapid spread of diseases</td>
<td>Match disease risk with distribution rates</td>
</tr>
<tr>
<td></td>
<td>Do no harm engagements!</td>
<td>Disease hazard management steps</td>
</tr>
<tr>
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<td></td>
<td>Paring suckers/ sterilize soil and use rich organic matter.</td>
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<td>Varietal fidelity</td>
<td>Seed provided not cultivars desired</td>
<td>Local mother garden tweaks to enable association</td>
</tr>
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<td></td>
<td>Diversity of cultivar desires</td>
<td>Explore labelling details</td>
</tr>
</tbody>
</table>
Multiplication rates

Sterilisation

Paring – minimize pest carry over

Protection – keeping off vectors

Sterilisation – corms and media

Logistics – planning and delocalization
Thank you