Micropropagation of Banana using a Liquid Culture System

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Micropropagation
with liquid culture systems

Sugarcane (1988-)
- A protocol was established using 22 Hawaiian commercial varieties (1988)
- Commercial application: 600,000 plantlets/34 varieties (1991)

Taro (1995-)
- For experimental plants of Bunlong and Lehua
- Large scale production: 52,000/13 taro cultivars

Pineapple (1996-)
- 30,000 plants/3 varieties
- In vitro plants for research (2 additional varieties)
Taro Micropropagation
Advantages of Liquid Culture

• Easy to identify contamination
• Faster multiplication
• Cheaper culture media without agar
• Easy to clean up the roots before shipment
Banana Micropropagation at HARC

Period: 1993- current

Clients: 10 small scale farmers (1993-1996)
          3 small scale farmers (2006-2007)
          2 large scale farmers (1996-97 and 2003-4)
          1 Canadian Nursery (1996)

Variety and Propagule Production:

<table>
<thead>
<tr>
<th>Variety</th>
<th>Production</th>
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<tbody>
<tr>
<td>William</td>
<td>253,700</td>
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<tr>
<td>Apple</td>
<td>28,800</td>
</tr>
<tr>
<td>Cooking Banana (Sava)</td>
<td>3,000</td>
</tr>
<tr>
<td>Canadian cold tolerant variety</td>
<td>1,000</td>
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<tr>
<td>Total</td>
<td>286,500</td>
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Micropropagated banana from Mokuleia to Japanese market

Shade house

Mokuleia field

Hardening

Supermarket in Japan

1997
Banana Micropropagation Protocol

1. Initiation of Lateral shoot culture

Explant Size:
1.5-2.0 x 0.5-0.75 inches
length Diameter

PM Medium
MS + BAP1-4 mg/L

4-6weeks
2. Shoot Multiplication

- Cut lateral shoots
- Transfer to fresh media
  Every 3-4 weeks

1 - 2 weeks:
  GyrotraryShaker 80-90rpm

2 - 3 weeks:
  Still culture
3. Root Initiation and Shipment

- Transfer to Root Incubation Medium
  $\frac{1}{2}$ MS + NAA 1mg/L
  2 weeks

- Clean plants by washing out rooting medium

- Wrap in wet paper towels and newspaper
Transplanted propagules at a grower’s nursery

Mortality <1% in nursery, <3% in the field
Root growth of propagules ready for field planting
Scale up of Banana Culture using Rita® System
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