Agro-economic assessment
Leren [Calathea allouia (Aubl.) Lindl] production in Trinidad and Tobago.

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New Carbohydrate source!
Leren or topi-tambo [*Calathea allouia* (Aubl.) Lindl]

- tuberous root crop
  - Puerto Rico, Trinidad and Brazil
- seasonal snack food
- culinary
  - new hors d’oeuvres
- little research
  - (Martin and Cabinillas, 1976)
Uses

- Substitute for water chest nuts
- Flour – pastry, biscuits
- Infant formula
Canned Water Chestnuts
Processed Tubers

Topi – tambo

Water – chestnuts

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Botany

Leren or topi-tambo [Calathea allouia (Aubl.) Lindl]

- family: marantaceae,
- West Indian arrow root, maranta arundinacea.
- herbaceous shrub [1.5 m ]
- rhizomes - fibrous roots with edible tubers
- tubers [5 to 12g]
Food Value

- protein [6.6%]
- starch [13 to 15%]
- Fat [0.0%]
Agronomy

cultivated by small farmers

subsistence farming practices

pure stands or intercropped (< 0.5 ha)

minimum inputs of fertilizer or pesticides.

Shade or full sunlight

Propagation - small pieces of rhizomes or the “head”

harvest and consumption coincides with the dry season
Agronomy

- Rhizomes are exhibit dormancy [January to July]
- Tuberization - photo periodic
- Crop cycle [9 to 14 MAP].
- Yield varied between 2,500 to 5,000 kg ha⁻¹ of fresh tubers
- Farm gate price - $2.50 to $3.00 kg⁻¹ (US) [Bridgemohan, unpubl. 2009]
Propagating Material
rhizome
Crop Senescence
Crop challenge

- Crop bio-diversity
- place in the agriculture
- expand production
- improve crop management
- increase income
- Post harvest and Processing
- novel product / consuming and presenting product
- absence of information
  - agronomy or crop management for yield improvement
To investigate the effects of crop:

**Nutrition X light X density X cropping systems**

on the crop development and yield of fresh tubers.
Methodology

Field and Greenhouse trials [2008 to 2010]

1. Effect of crop nutrition and light intensity on the yield (shoot dry matter and tubers) of *calathea allouia*,
   [Pot / shade-house Study],

2. Effect of crop nutrition, crop density and intercropping on the yield of *calathea allouia*
   [Field Study]
Nutrition [ F ]

Fertilizer rate [kg.ha⁻¹]

[13:13:20 (NPK)]

- F1 - 400
- F2 - 500
- F3 - 600
Light
(i) Shade
Light

(ii) Sunlight
Crop Density

Density t.p.h$^{-1}$

- 27.5
- 20.8
Cropping Systems
(i) Intercrop
Cropping Systems
(ii) Pure stand
Table 1. The effect of Fertilizer and Light on the Dry Matter yield of Leren

<table>
<thead>
<tr>
<th>Fertilizer rate [kg.ha⁻¹]</th>
<th>Shoot dry matter plant⁻¹ [g]</th>
<th>Rhizome dry matter plant⁻¹ [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sunlight</td>
<td>shade</td>
</tr>
<tr>
<td>400</td>
<td>102.3</td>
<td>91.65</td>
</tr>
<tr>
<td>500</td>
<td>101.4</td>
<td>108.2</td>
</tr>
<tr>
<td>600</td>
<td>98.1</td>
<td>112.9*</td>
</tr>
<tr>
<td>mean</td>
<td>102.19</td>
<td></td>
</tr>
<tr>
<td>S.E.</td>
<td>9.186</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. The effect of Crop Nutrition and Light on the tuber yield of Leren

<table>
<thead>
<tr>
<th>Fertilizer rate [kg.ha(^{-1})]</th>
<th>Nos. Tubers.plant(^{-1})</th>
<th>Tuber yield.plant(^{-1}) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sunlight</td>
<td>shade</td>
</tr>
<tr>
<td>400</td>
<td>41.1</td>
<td>31.8</td>
</tr>
<tr>
<td>500</td>
<td>33.3</td>
<td>44.25*</td>
</tr>
<tr>
<td>600</td>
<td>39.3</td>
<td>24.3</td>
</tr>
<tr>
<td>mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.E.</td>
<td>[5.237]</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. The effect of Crop Density and Fertilizer under 2 Cropping Systems on the yield of Leren

<table>
<thead>
<tr>
<th>Density t.p.h(^{-1})</th>
<th>Fertilizer Kg.ha(^{-1})</th>
<th>Intercrop</th>
<th>Pure stand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rhizome g.pl(^{-1})</td>
<td>Tuber weight pl(^{-1})</td>
</tr>
<tr>
<td></td>
<td>27.5 400</td>
<td>378.5</td>
<td>123.5</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>406</td>
<td>102.3</td>
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<tr>
<td></td>
<td>600</td>
<td>357.8</td>
<td>193.7</td>
</tr>
<tr>
<td></td>
<td>20.8 400</td>
<td>439.9</td>
<td>201.2</td>
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<tr>
<td></td>
<td>500</td>
<td>442.8</td>
<td>274.4*</td>
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<tr>
<td></td>
<td>600</td>
<td>432.1</td>
<td>264.2</td>
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<tr>
<td>mean</td>
<td></td>
<td>410.47</td>
<td>142.79</td>
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<tr>
<td>S.E.</td>
<td></td>
<td>32.850</td>
<td>227.90</td>
</tr>
</tbody>
</table>
Recommended Cropping System for small scale production of Leren
Conclusion

- Production confined to small farms
- Low input crop management
- Basal fertilizer application [0.5t.ha⁻¹] yields increased under shade (9,800kg. ha⁻¹)[green house]
- Intercropping (5,500kg.ha⁻¹). [field]
- Farm gate price at $20.00 kg⁻¹
- Income of $110,000 to $190,000(TT). ha⁻¹ over nine (9) months period
- Additional income [0.75ha⁻¹] pigeon pea intercrop.
Cooked Leren

Topi - tambo

01/28/2007
Thank you