

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

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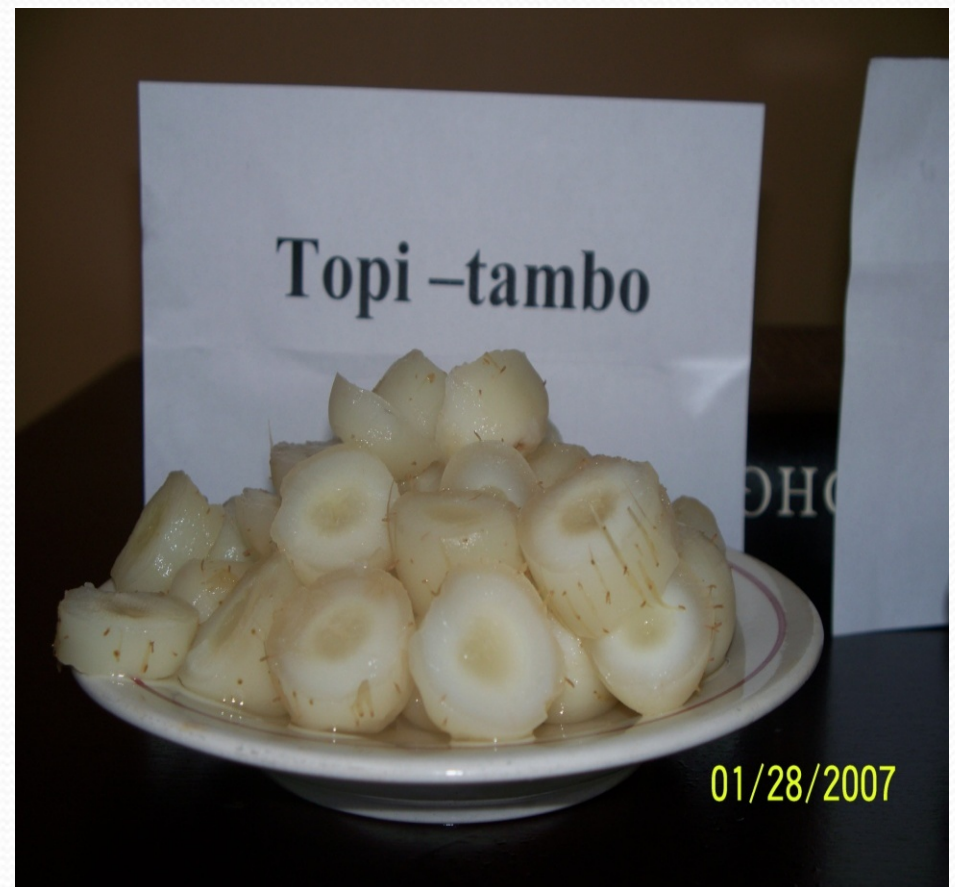
New Carbohydrate source!

01/28/2007



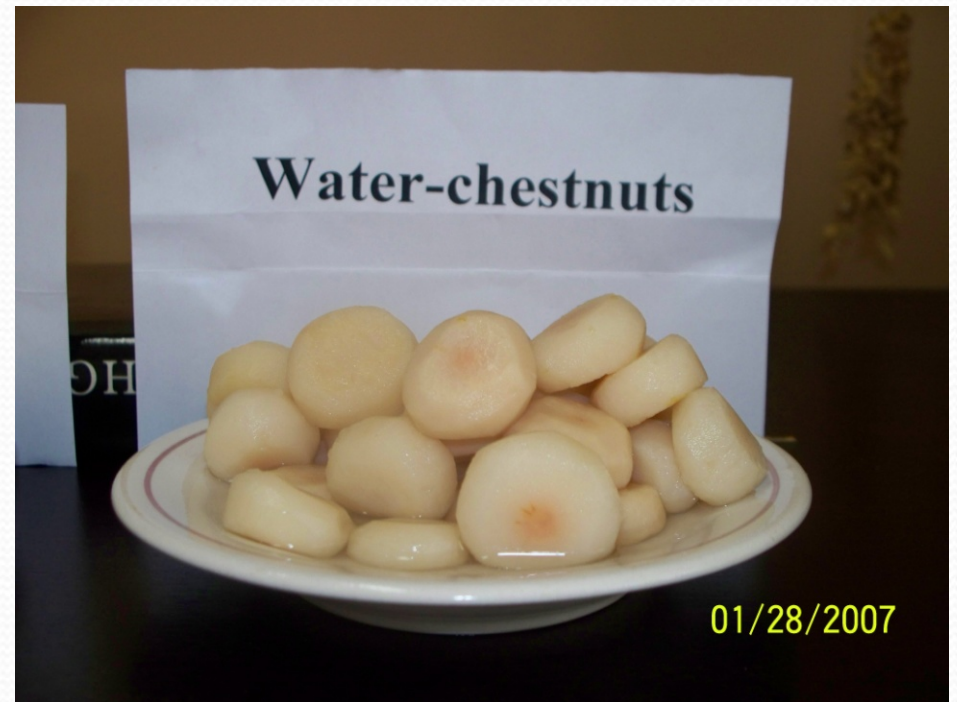
Leren or topi-tambo [*Calathea allouia* (Aubl.) Lindl]

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



Uses

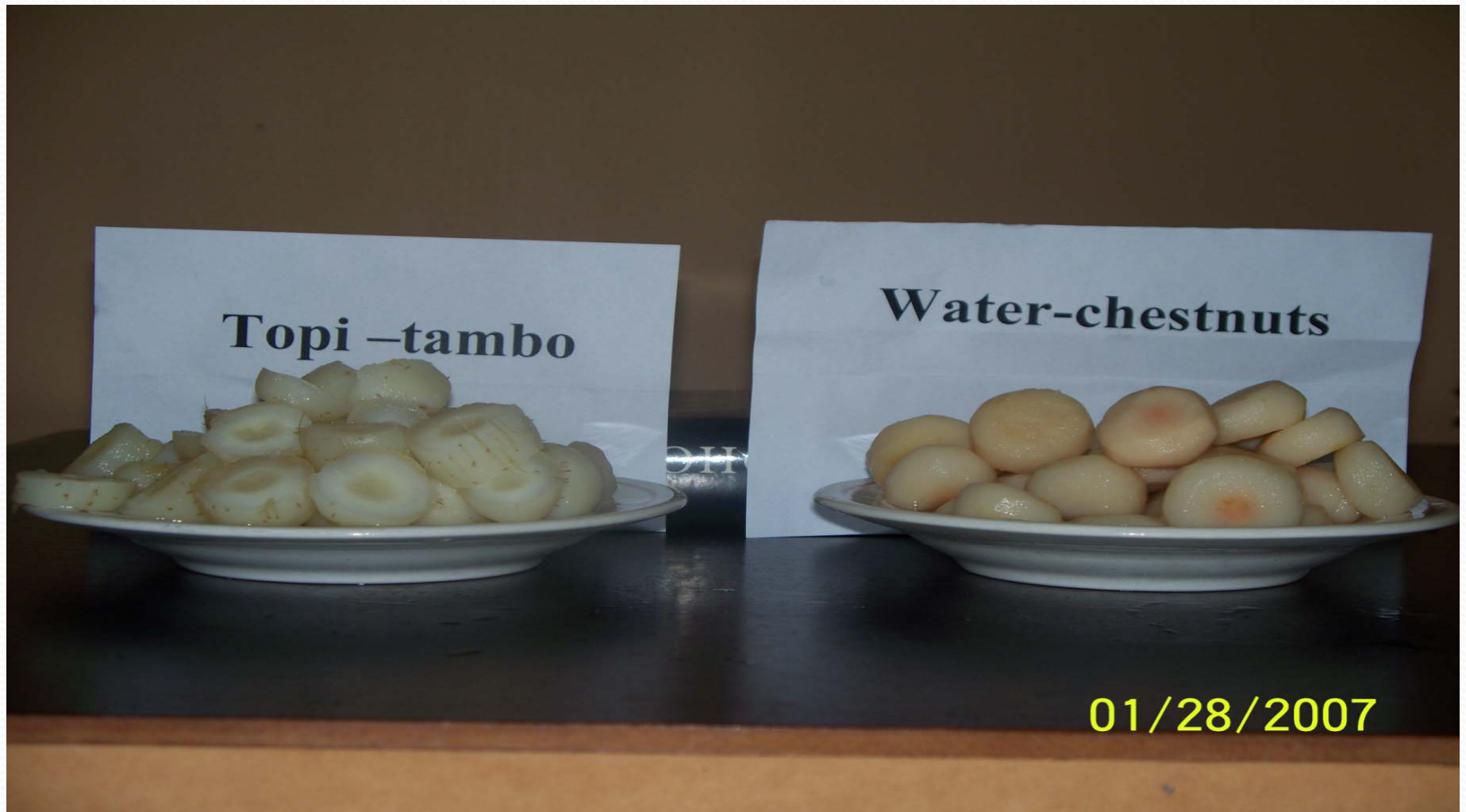
- Substitute for water chest nuts
- Flour – pastry, biscuits
- Infant formula



Canned Water Chest nuts



Processed Tubers



Botany

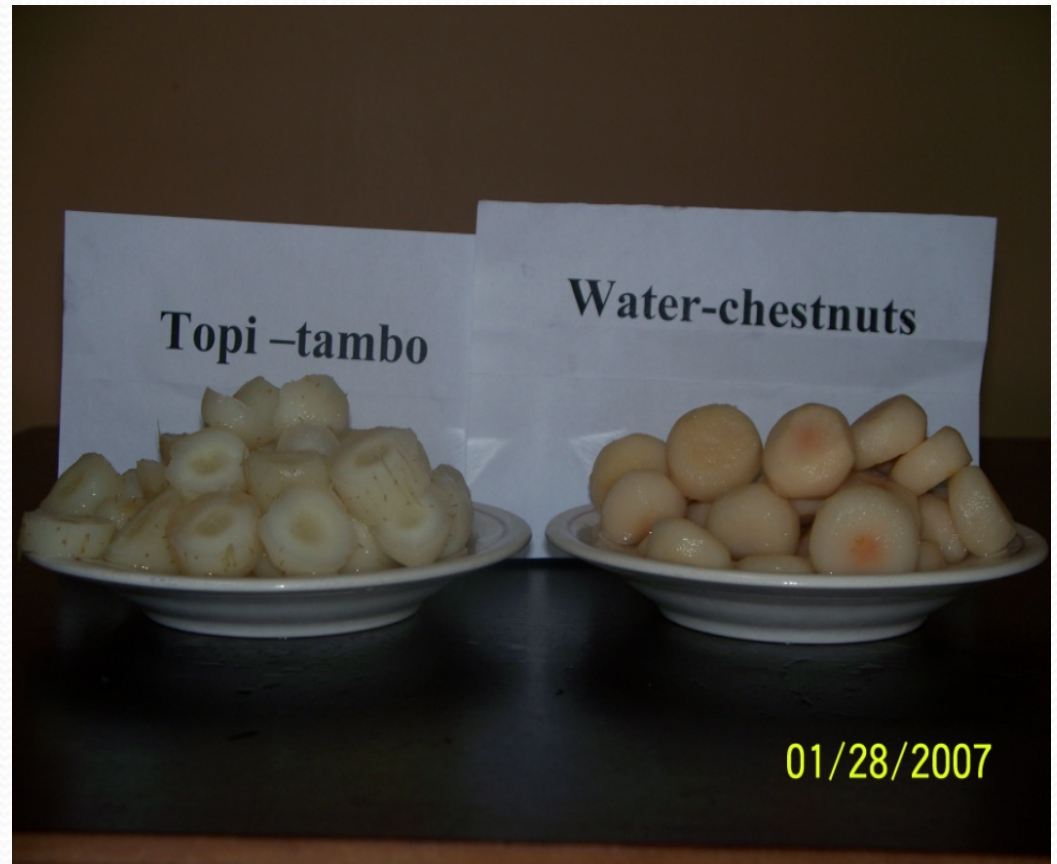
Leren or topi-tambo [*Calathea allouia* (Aubl.) Lindl]

- 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 5,000kg.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



Experimental

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

Fertilizer rate [kg.ha ⁻¹]	Shoot dry matter.plant ⁻¹ [g]		Rhizome dry matter.plant ⁻¹ [g]	
	sunlight	shade	sunlight	shade
400	102.3	91.65	574.7	524.5
500	101.4	108.2	600.2	569.34
600	98.1	112.9*	584.3	682.2*
mean	102.19		599.11	
S.E.	9.186		88.861	

Table 2. The effect of Crop Nutrition and Light on the tuber yield of Leren

Fertilizer rate [kg.ha ⁻¹]	Nos. Tubers.plant ⁻¹		Tuber yield.plant ⁻¹ [g]	
	sunlight	shade	sunlight	shade
400	41.1	31.8	291.6	378.8
500	33.3	44.25*	306.1	473.3*
600	39.3	24.3	378.8	378.4
mean	35.6		333.34	
S.E.	[5.237]		[51.321]	

Table 3. The effect of Crop Density and Fertilizer under 2 Cropping Systems on the yield of Leren

Treatment		Intercrop			Pure stand		
		Rhizome g.pl ⁻¹	Tuber weight pl ⁻¹ .	Tuber nos	Rhizome g.pl ⁻¹	Tuber weight pl ⁻¹	Tuber nos
Density t.p.h ⁻¹	Fertilizer Kg.ha ⁻¹						
27.5	400	378.5	123.5	26.2	487.3	162.7	28.3
	500	406	102.3	15.2	389.8	140.3	25.6
	600	357.8	193.7	34.5	522.9	147.6	25
20.8	400	439.9	201.2	22.8	363.7	121.7	21.5
	500	442.8	274.4*	38	626.12	167.7	26.5
	600	432.1	264.2	33.8	693	229.7*	34.4
	mean	410.47	142.79	24.4	456.42	158.60	26.48
	S.E.	32.850	227.90	3.294	41.54	18.162	2.307



Recommended Cropping System for small scale production of Leren

Conclusion

- Production confined to small farms
- Low input crop management
- basal fertilizer application [$0.5\text{t}\cdot\text{ha}^{-1}$] yields increased under shade ($9,800\text{kg}\cdot\text{ha}^{-1}$)[green house]
- intercropping ($5,500\text{kg}\cdot\text{ha}^{-1}$). [field]
- farm gate price at $\$20.00\text{ kg}^{-1}$
- income of $\$110,000$ to $\$190,000(\text{TT})\cdot\text{ha}^{-1}$ over nine (9) months period
- additional income [0.75ha^{-1}] pigeon pea intercrop.

Cooked Leren





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