



Optimizing Yield and Quality of Hawaii-grown Turmeric

Collection and Evaluation of Curcuma Germplasm

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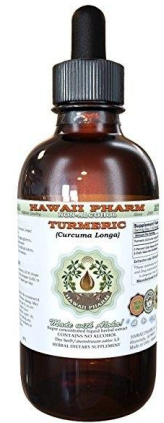
Historic Importance

- Food & Flavor
- Medicine
- Dye
- Religious
- Ornamental



Current Situation

- \$6.00/lb Farmgate (Hawai'i 2016)
- Production rapidly expanding (2018 estimate = 60-80 acres statewide)
- Local market easily saturated.
- Increased exports.
- Value addition.



Turmeric

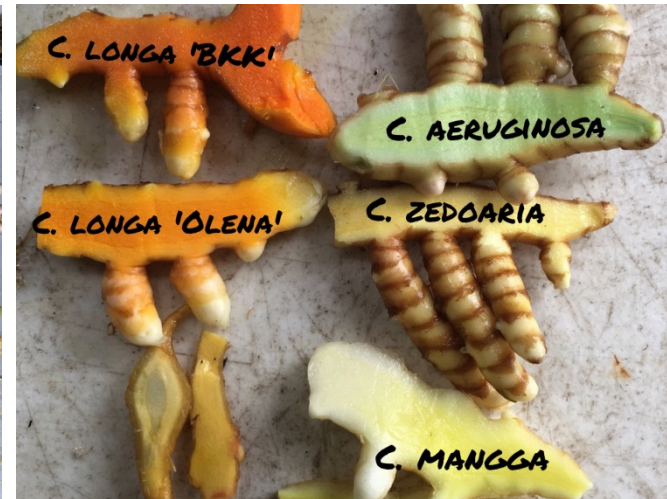
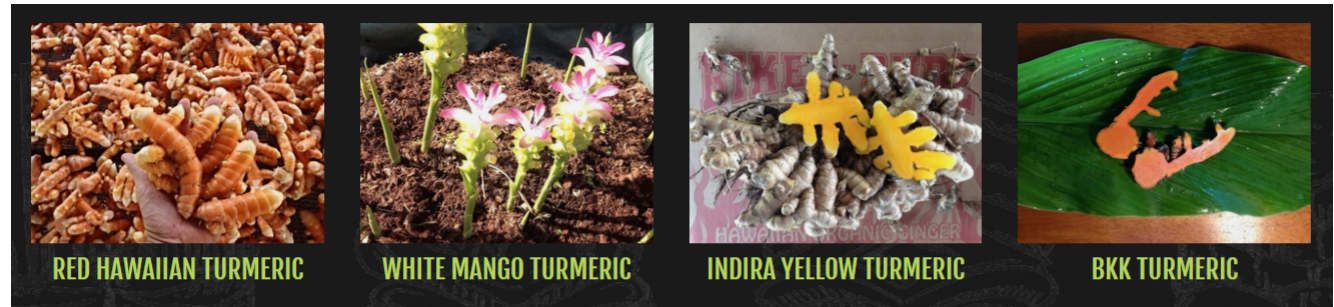
- **Seasonal (April/May-February/March).**
- **600 - 1,500 mm H₂O/season.**
- **Reported nutrient removal (*Ravindran et al., 2007*):**
 - **N: 16.5 kg/t**
 - **P₂O₅: 3.1 kg/t**
 - **K₂O: 44.5 kg/t**
- **Relatively low pest pressure.**



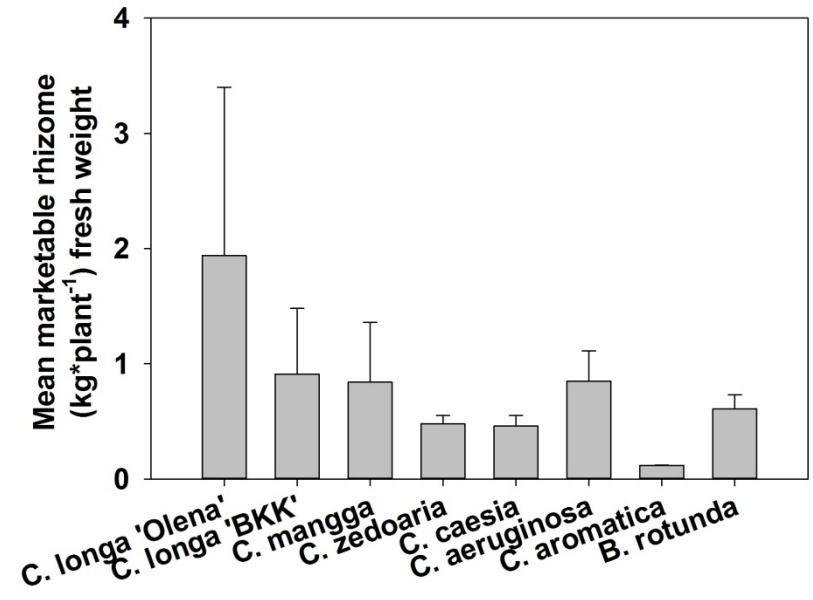
Turmeric, Aquaponic 2015-2016

- **Observational.**
- **Increase familiarity with local germplasm.**
- **Increase planting material.**

<http://www.hawaiianorganicginger.com/>



Turmeric, Terrestrial 2016-2017



Manual Harvest Sucks!!!



Field Trial 2017-2018

- Planted May 2017.
- Twelve locally collected accessions.
- Harvested January 2018.
- Data collected:
 - Yield
 - [Curcumin]







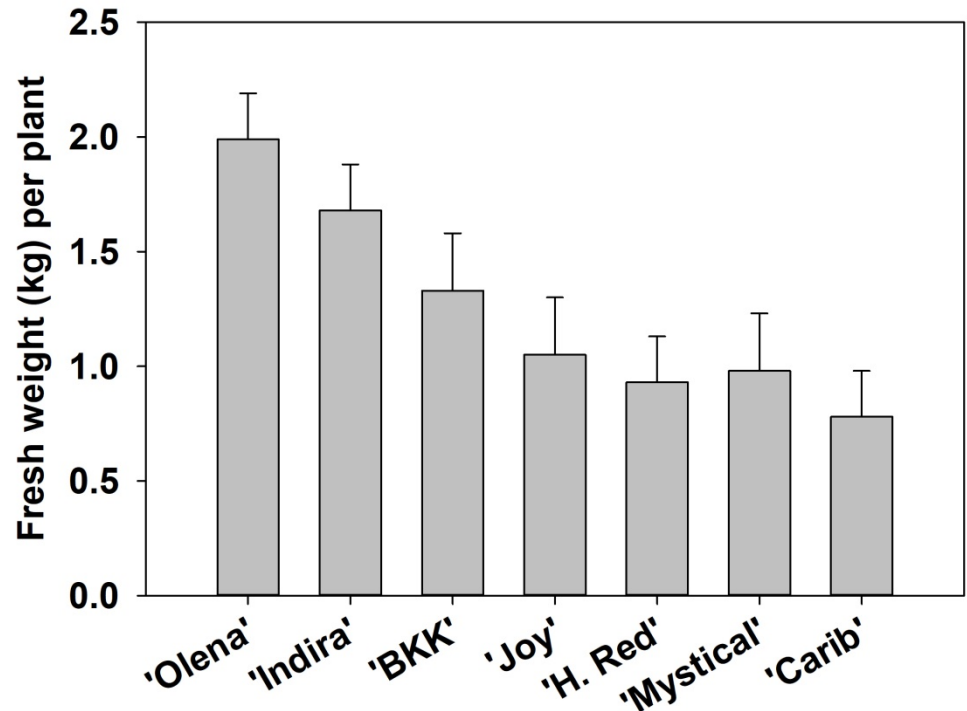






Yield of *C. longa*

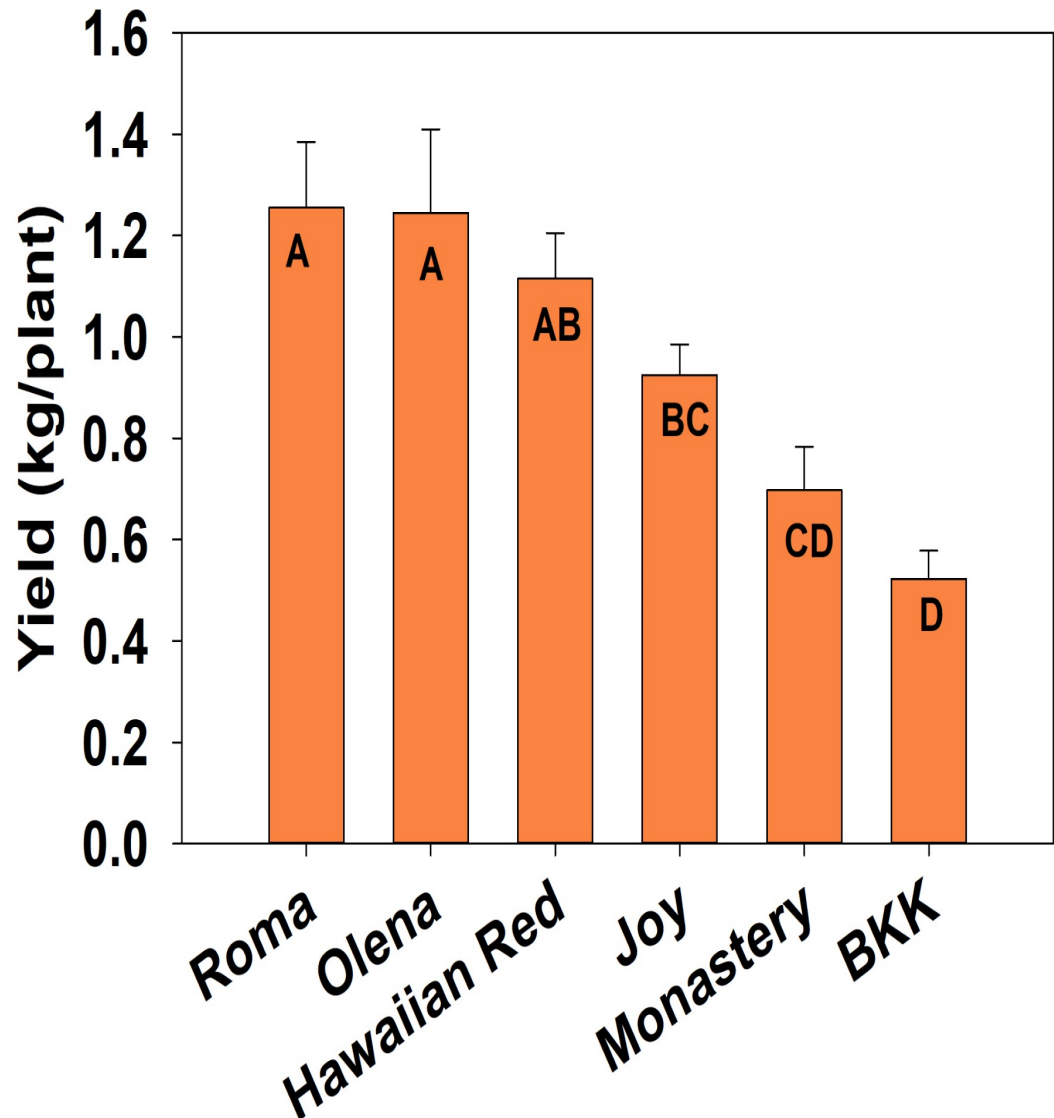
- Yields ranged between 0.75 – 2.0 kg of cleaned, marketable fingers per plant.
- Estimated @ ~ 16 - 43 t/ha.
- Reported commercial yield = 13 to 35 t/ha of fresh turmeric.
- Other attributes besides yield important.





Kauai yield of *C. longa* – 2020 harvest

- Yields ranged between 0.38 – 1.66 kg of cleaned, marketable fingers per plant.
- Estimated @ ~ 8 - 35 t/ha.
- Reported commercial yield = 13 to 35 t/ha of fresh turmeric.
- Other important attributes?

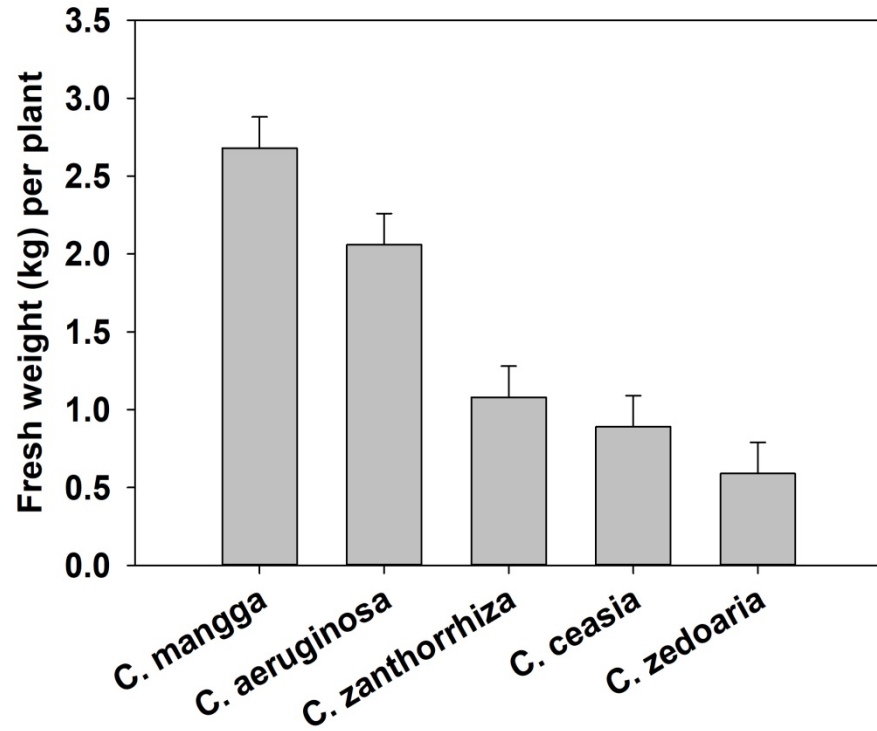


Yield of *C. longa*

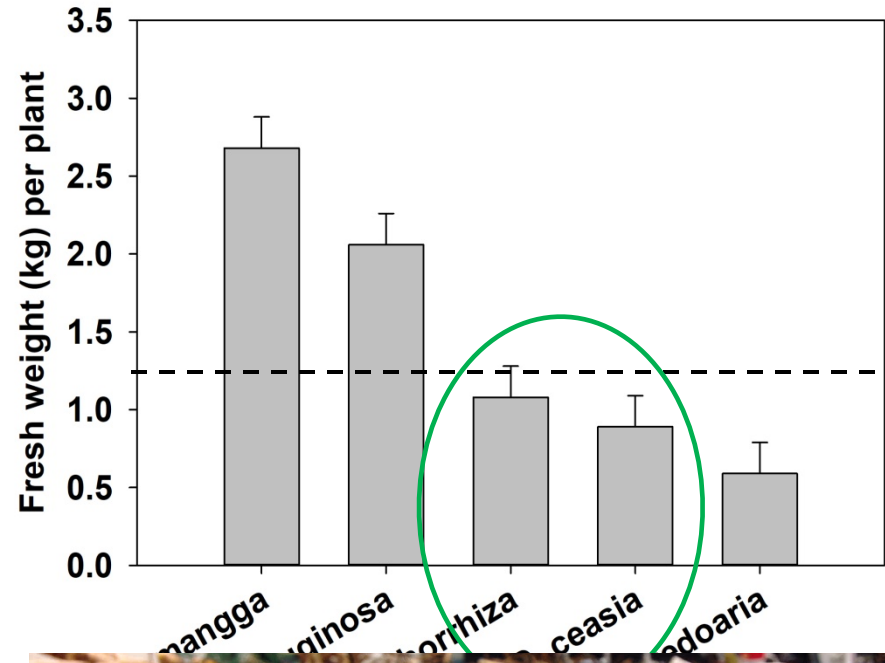
- Yields ranged between 0.75 – 2.0 kg of cleaned, marketable fingers per plant.
- Estimated @ ~ 16 - 43 t/ha.
- Reported commercial yield = 13 to 35 t/ha of fresh turmeric.
- Other attributes besides quality important.



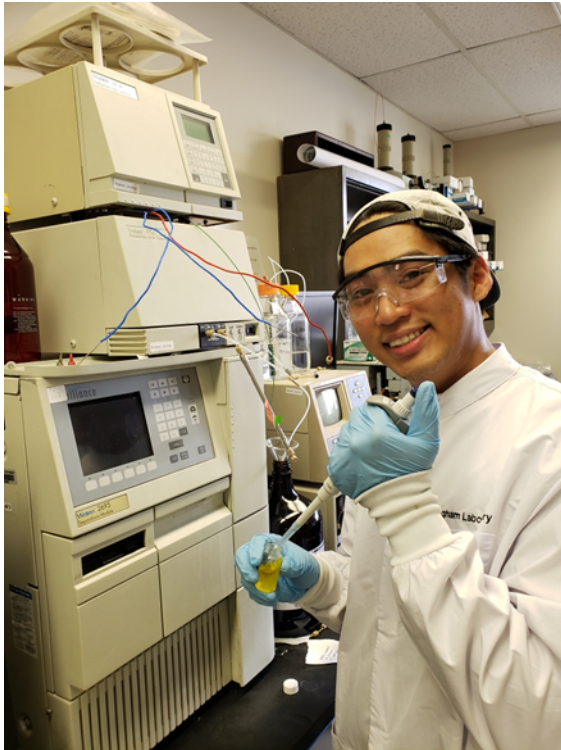
Yield of other species



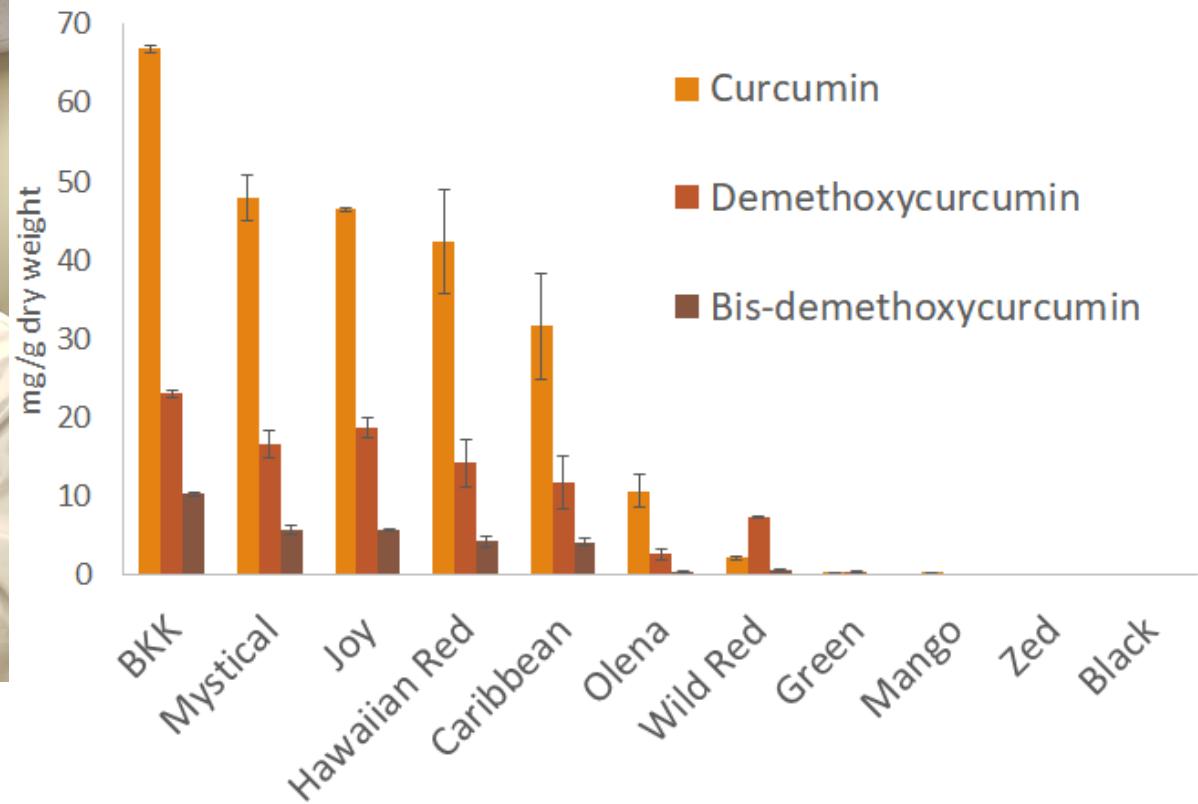
Yield of other species



HPLC Analysis of Curcuminoids



Major Curcuminoid Content of 2018 Turmeric



#Turmerictrail2018

Singapore-India-Myanmar-Thailand

3 February – 5 March, 2018



Singapore Botanic Gardens



Singapore Botanic Gardens



Singapore Gardens by the Bay



Import Permits & Phytosanitary Certificates



India, Kerala





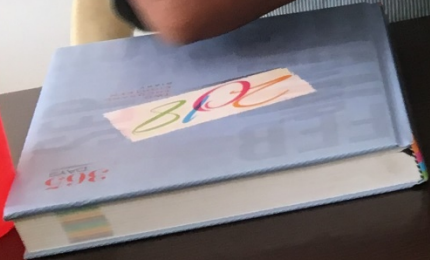
India, Erode (Tamil Nadu)











Sittilingi





Karnataka





VIJAYA GR
25kg

VIJAYA GR
25kg
NPK 15-15-15
MADE IN INDIA

VIJAYA GR
25kg



Myanmar



Aquaponic Grow-Out



Aquaponic Grow-Out



Current field trial 2018-2019

- Mechanized planting
June 2018.
- Increased # of local *C. longa*.
- Fertilizer response trial using 'Hawaiian Red' (0, 100, 200, 400 lb N/a).
- Anticipated harvest
March 2019.
- Demonstrate
mechanical planting/
harvesting.





Mahalo



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