HARC
Coffee Research Report

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Hawaii Agriculture Research Center (HARC)

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HCA Conference
Waikapu, Hawaii
HARC’s Coffee Research

• Produce high-quality coffee cultivars with disease- and pest-resistance

• Understand the biology of coffee development
  – DNA Sequencing of canephora coffee (de Kochko et al 2011)
  – Evolutionary History of Coffea arabica (Yu et al 2011)
  – Characterization of prolyl oligopeptidase genes in two coffee cultivars, typica and mokka (Singh et al 2011)
Specialty High Value Agroforestry Forestry Trial at Maunawili

- Inter-cropping of selected Koa and coffee with high cupping quality
- HARC Maunawili Station, Oahu
  3 acre, un-irrigated, elevation 450 ft
- Selected arabica varieties
- PI: Nick Dudley, NRCS- USDA funded
**International *canephora* Sequencing Consortium**

*Coffea canephora* (Robusta coffee)
2n=44 (DH)

**Genome annotation**

- Identifying the locations of genes and the coding regions in a genome
- Determine what those genes do.

Once a genome is sequenced, it needs to be annotated to make sense of it!

De Kochko et al (2011)
Cloning/ Tissue Culture of Selected Hawaiian Arabica Hybrids

Sub-contracted from HCA/ HCGA for SCBGP-FB, 2010-2012
RITA®, Temporally Immersion System
Acclimatization:
Sterile environment to soil
Nematode Resistant Ethiopian arabica
Nematode Reproductive Factors of *M. konaensis* on semi-wild Ethiopian arabica

Accession Numbers and Cultivars

ET8, ET11C, ET15, ET17, ET25, ET28, ET52, ET57, ET25-B, Fukunaga, Kona Typica, Yellow Catuai

Aoki et al. (2012)
**Meloidogyne konaensis** reproductive factors (Rf) of 4 Ethiopian arabica progeny (8 months after 1000 egg inoculation)

<table>
<thead>
<tr>
<th>Parents</th>
<th>Reistant</th>
<th>Rf</th>
<th>Susceptible</th>
<th>Rf</th>
<th>Total</th>
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<td>26.0</td>
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<tr>
<td>Et25</td>
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<td>3</td>
<td>2.6-11.7</td>
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<tr>
<td>Et17</td>
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<td>&lt;1.0</td>
<td>0</td>
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<tr>
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<td>5</td>
<td>&lt;1.0</td>
<td>0</td>
<td>-</td>
<td>5</td>
</tr>
</tbody>
</table>

B. Sipes unpublished data 2012
Metabolomic Analysis of Coffee

Collaboration with Suntory Business Expert Limited and Innovation Center for Medical Redox Navigation, Kyushu University, Fukuoka,

- Chemical component information in arabica coffee using LC/MS analysis
- Obtained 2000-4000 chemical components in green beans from 8 cultivars grown at HARC, Kunia Field.
- Separated varieties clearly by PCA score of total samples
- Expect that quality of coffee correlates to both genotypes and chemical components- metabolomics
NHK series: Dramatic Life
"Coffee: Aroma which manipulated mankind"
Dec 19, 2011, NHK BS2 Channel
HARC Coffee Research Team and Collaborators

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ICGN (International Coffee Genome Network)

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