HARC
Coffee Research Report

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Hawaii Agriculture Research Center (HARC)

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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
- Slected arabica varieties
- PI: Nick Dudley, NRCS- USDA funded
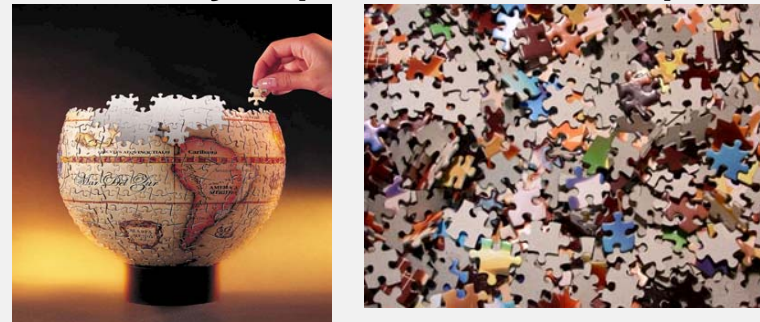
International *canephora* Sequencing Consortium

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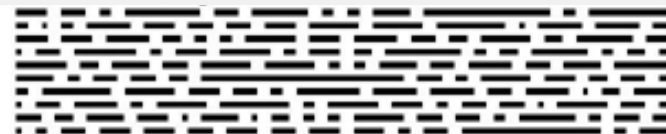2n=44 (DH)

Sequencing 454 Sequencer Illumina

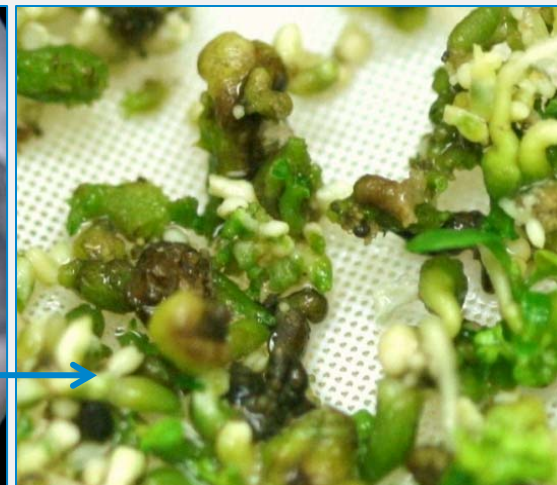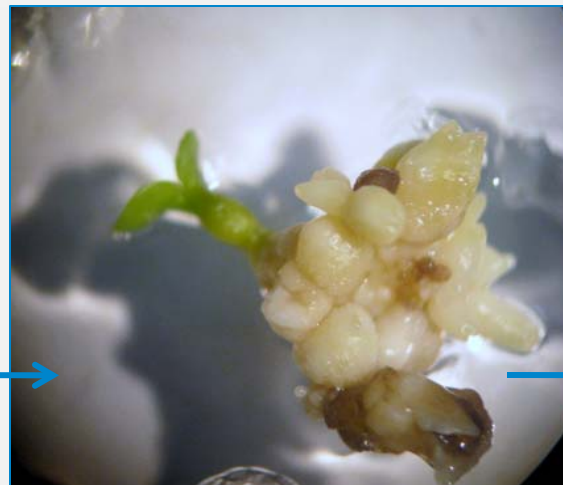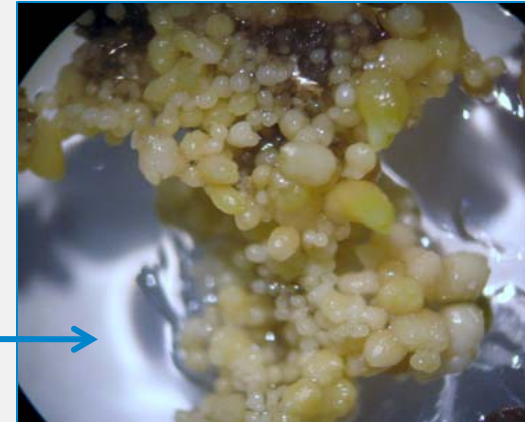**Assembly of pieces to a whole picture**

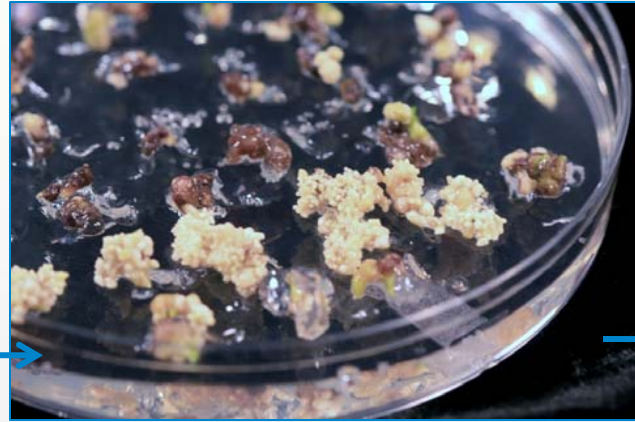**Genome annotation**

• 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
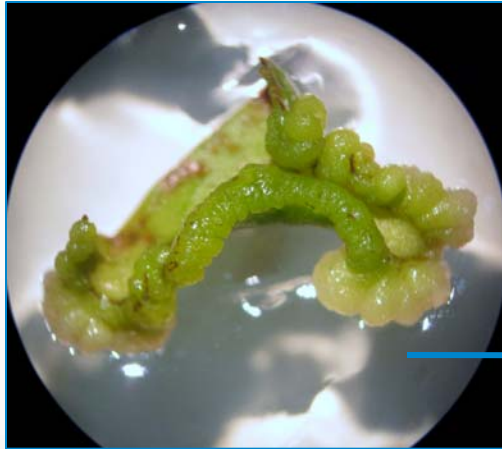
Sub-contracted from HCA/ HCGA for SCBGP-FB, 2010-2012

RITA® , Temporally Immersion System

RITA® system

Acclimatization:
Sterile environment to soil

Nematode Resistant Ethiopian arabica

Nematode Reproductive Factors of *M.konaensis* on semi-wildEthiopian arabica
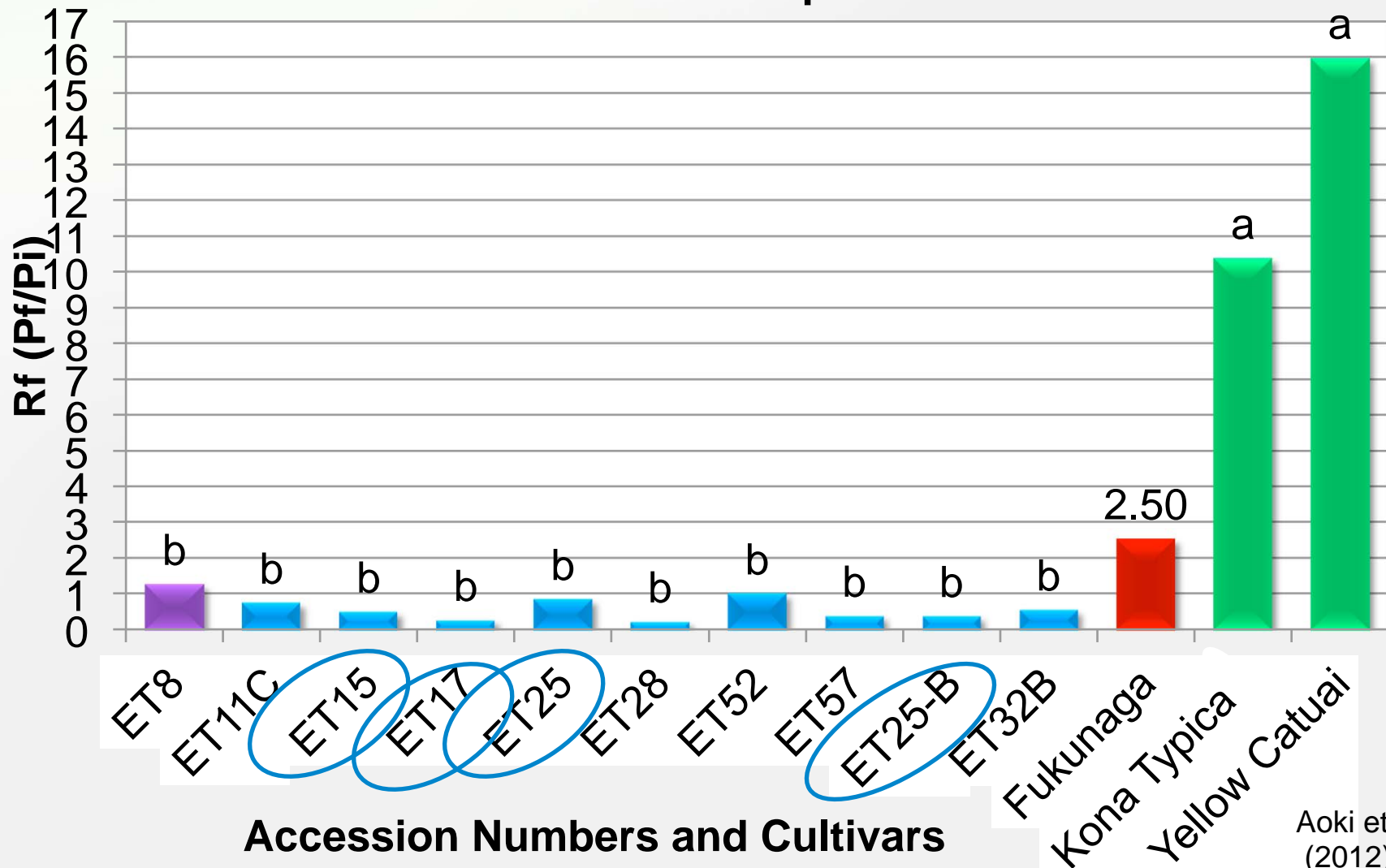
Rf (Pf/Pi)

Accession Numbers and Cultivars

ET8, ET11C, ET15, ET17, ET25, ET28, ET52, ET57, ET25-B, ET32B, Fukunaga, Kona Typica, Yellow Catuai

2.50

Aoki et al (2012)

Meloidogyne konaensis reproductive factors (Rf) of 4 Ethiopian arabica progeny (8 months after 1000 egg inoculation)

Parents	Reistant	Rf	Susceptible	Rf	Total
Et15-10	4	<1.0	1	26.0	5
Et25	2	<1.0	3	2.6-11.7	5
Et17	5	<1.0	0	-	5
Et25B	5	<1.0	0	-	5

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"
Dec19,2011, NHK BS2 Channel

HARC Coffee Research Team and Collaborators

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ICGN (International Coffee Genome Network)