Cacao in Hawaii: 1831 to 2017

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1831

German botanist Franz J. F. Meyen observed ‘Guatemalan Cocoa in June 1831 in the garden of Don Marin, an assistant to King Kamehameha I.

Cited in Kenneth Nagata’s brilliant “Early Plant Introductions to Hawaii” Hawaiian Journal of History, Volume 19, 1985.

1850 to 1905

1850 Dr. Hillebrand re-introduced cacao into Honolulu (Foster Botanical Garden)

1890's Crick and Hitchcock start plantings in Hilo, Hawaii island

1905 Hawaii Experiment Station (predecessor to CTAHR) made 3 acre planting near Hilo

1914 to 1918 - World War I

Disrupted shipping raised world cocoa prices

1917 HI legislature asks Hawaii Experiment Station to comment:

- Target yield of 600 lbs/acre/ yr of dried seed
- Make cocoa or chocolate to compete with low cost producer countries
- Locate farms near sea level, in moist, sheltered areas of Hilo, Puna, Hana

Post World War I

Cocoa prices dropped after the war.
Interest waned in Hawaii.
Plantings were abandoned.
Research ceased.

Post World War II

CTAHR's Dean commented in 1956:

"We know it grows in Hilo, Kona, and Hana plus no major diseases here. Someone needs to grow 10 acres for 10 years and we'll know if its profitable."

UH Horticulture Professor RA Hamilton said in 1965:

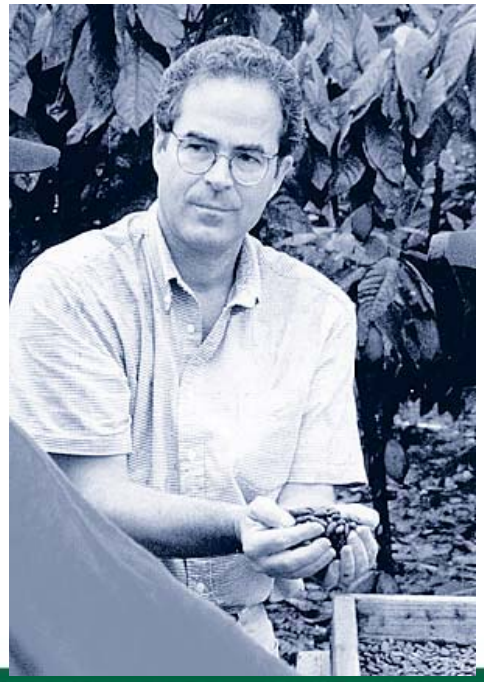
"There does not appear to be any logical basis for expecting cacao to develop into a useful tree crop for Hawaii in the foreseeable future." High labor costs, lack of suitable land, constant trade winds and fluctuating dry bean prices means its unlikely to be successful. He did not envision Hawaii making chocolate for the new craft chocolate market.

The ten acre challenge was not answered until Waialua Chocolate and Coffee (Dole Foods) demonstrated success in the early 2000's

Fast forward 30 years to 1986 to 1992

Jim Walsh and Hawaii Cocoa developed renewed interest when he planted imported commercial varieties near Hilo. Several international chocolate companies were potential partners. But interest waned when fields failed. He did recruit some farmers.

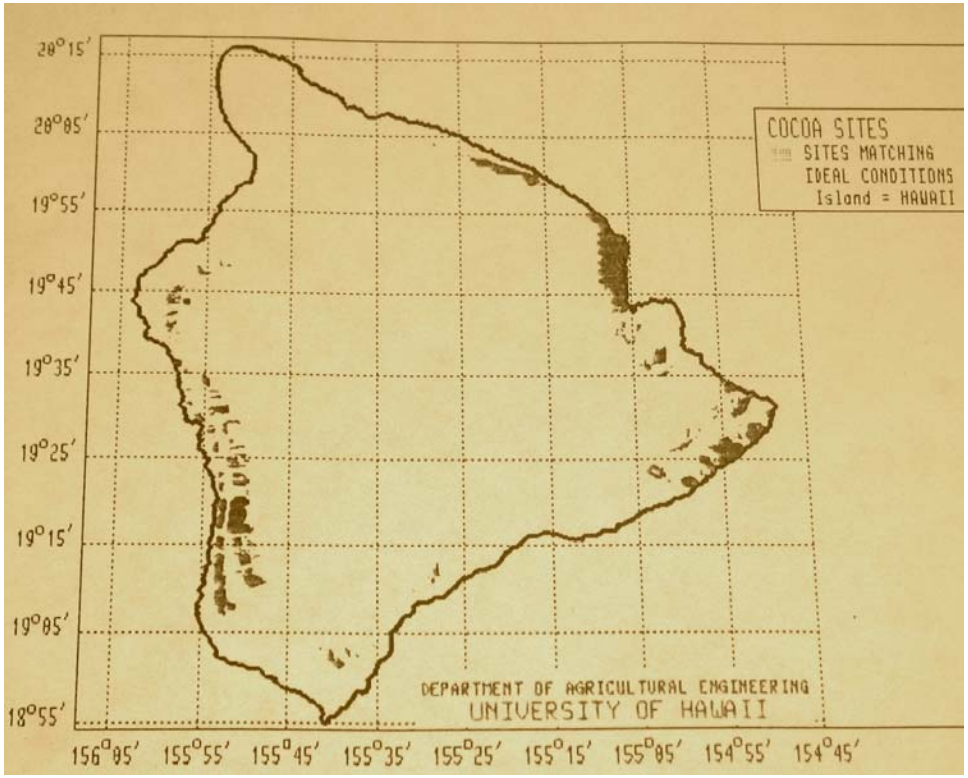

Grafting in the bud garden




Lahaina, Maui site

1989

- CTAHR releases a bulletin under its Economic fact Sheet series on Cacao citing of the world cacao facts and mentions the Hershey - Hawaii Cocoa venture.
- CTAHR MS student thesis discusses determining cacao sites using a GIS .



1990s

Clarence Hodge on his 1 acre farm near Holualoa, Kona, 1992. He planted grafted trees from and contracted to sell beans to Hawaii Cocoa. He died, farm abandoned and sold.

Purchased by Bob and Pam Cooper. They build a bean to bar operation called the Original Hawaiian Chocolate Factory. They sell pods for planting and purchase fresh beans from growers.

Late 1990s

1997 Mike Mclean with Dole Foods plants a 17 acre cacao orchard in Waialua, Oahu with seeds from the UH Waimanalo research farm. Mike Conway rejuvenates the orchard in 2004. Today is the largest producing cacao farm in the state.

2000's

Richard Oszustowicz formed Hawaii Gold Cacao Tree in east Hawaii. Orchard planted. Planned to build a factory, but could not acquire funding.

Small growers begin planting on all islands

Dole rejuvenates its Waialua, Oahu cacao.

1st Kona Chocolate Festival 2002

2004

John Nanci - the Chocolate Alchemist, achieves a breakthrough for very small scale chocolate making. He adapts consumer-grade food processing equipment to make good quality chocolate.

Hawaii farmers can make chocolate to sell, set up chocolate-themed B&Bs, and take advantage of ‘suit case exports’ of chocolate just as coffee farmers do with roasted coffee.

This is the beginnng of

CTAHR/UHM, USDA, and HARC begin work on cacao genetics 2003.

Hawaii Tropical Fruit Growers (HTFG) organizes a cacao group.

First Hawaii Cacao Symposium is June 2005.

2005

CTAHR's Bittenbender starts Hawaii State-wide Cacao variety Trial (HSCT). Grants funded by Hawaii Dept of Ag (2008), HTFG (2010), and CTAHR (2005 − present). His team would evaluate10 promising seedling trees. Copied by grafting and transplanted as 40 trees per farm across the state. Yield, tree performance, and chocolate quality were evaluated.

Goal- create the world of chocolate in the islands.

2009

Rep. Corrine Ching guides a resolution -HCR 326 to produce a report to ‘Expedite the Production and Delivery of Hawaii Cacao to the Marketplace’

2010

Rep. Ching guides HCR 89 declaring ‘February Chocolate month in Hawaii’.

2011

Hawaii Chocolate Meeting at State Capital organized by Rep. Corrine Ching, Amy Hammond and HC Bittenbender

2011

1st Hawaii Chocolate Festival in Honolulu organized by Amy Hammond

Several new companies begin selling chocolate made with Hawaii-grown cacao:

Waialua Chocolate

Malie Kai

Madre Chocolate

Sharkey's

Manoa

Lonohana

2012

Hawaii Chocolate and Cacao Association, a state-wide organization of farmers, bean to bar, and chocolatiers, formed to guide the development of the cacao to chocolate industry.

2014

Dan O'Doherty (CTAHR, now Cacao Services and Scientific Consulting, Inc.) wins a Heirloom award from the Fine Chocolate Industry Association. His award demonstrates not only the quality of cacao in Hawaii but the importance of well managed fermentation.

2015

HCCA holds first neighbor island annual conference on Kauai.

Events Hawaii led by Amy Hammond begins chocolate festivals across the state.

Bittenbender completes first chocolate evaluation of HSCT varieties grown at different locations.

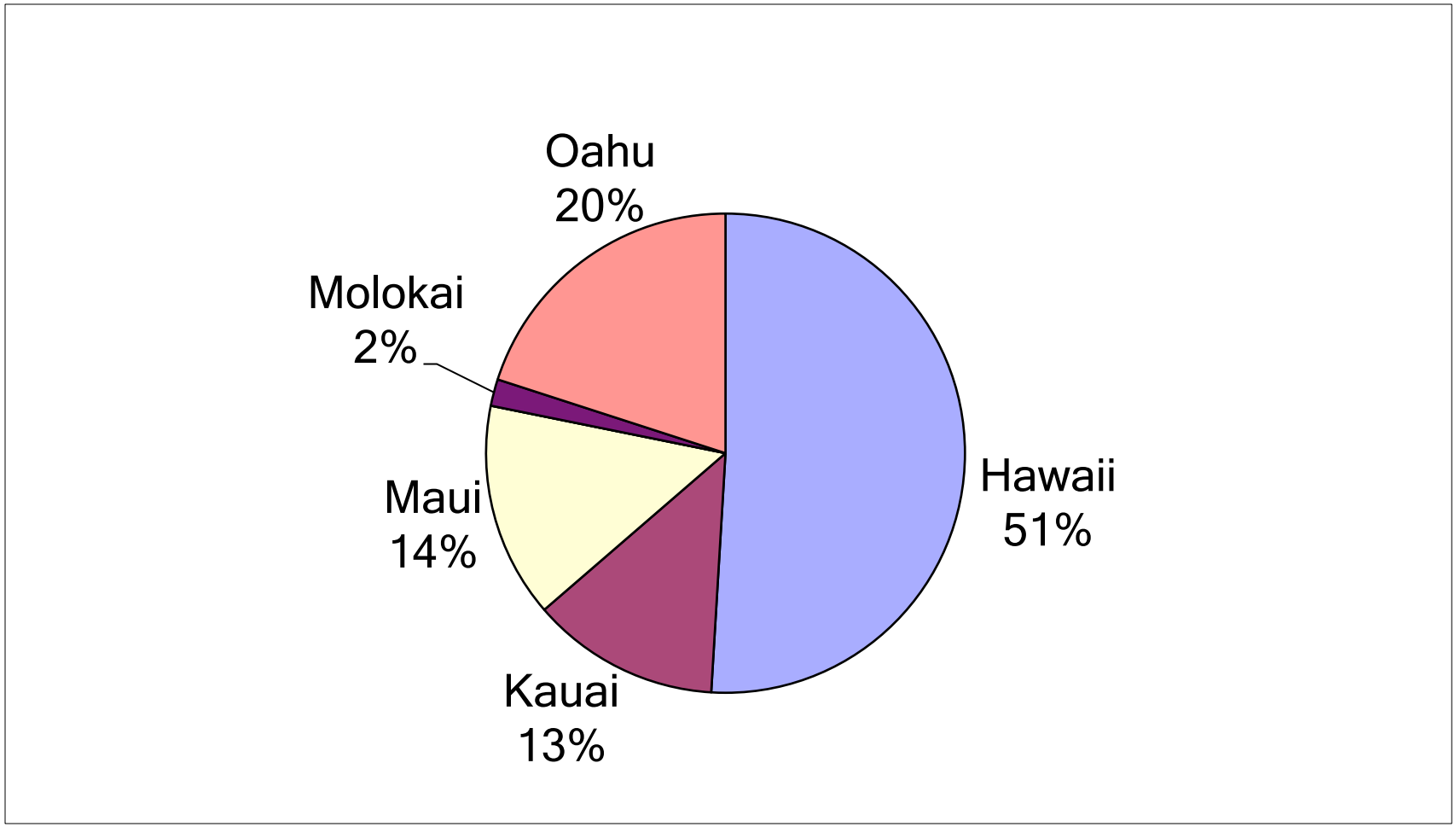
USDA begins grafting its variety trial in Hawaii based on its cacao varieties developed in Puerto Rico, South and Central America.

Farmers are planting and/or expanding seedling orchards on Kauai, West and East Hawaii, Molokai, and Maui. Oahu, Dole's 17 acre begins expansion as do farms on the North Shore and Windward Oahu.

2017 Hawaii Cacao Survey:
January to December 2016

Presented March 12, 2017
to the Hawaii Chocolate and Cacao Association

My cacao farm is on



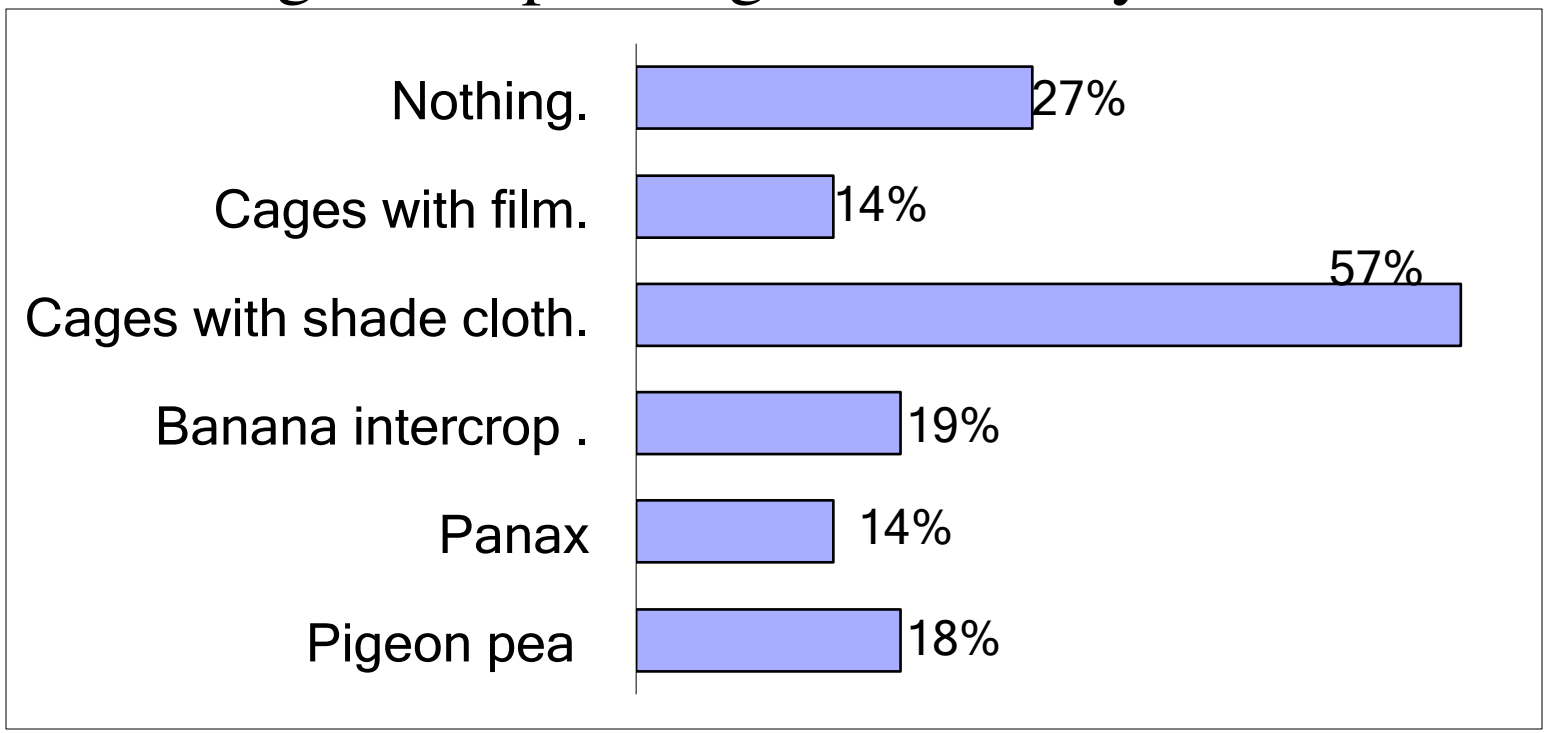
Half of cacao farms are on Hawaii, followed by Oahu, Maui, Kauai and Molokai.

The average elevation of my cacao farm is ….

State average elevation is 590 ft , the median is 50% of farms are below 450 ft and 50% above.

Average farm elevation varies by island:
Hawaii island average is 900 ft, due to coffee farms growing cacao in Kona (12 are above 1000 ft) ,
Maui is 330 ft,
Kauai is 130 ft,
Oahu is 260 ft.

Did you need to protect young trees from wind and/or sun damage after planting? What did you use?

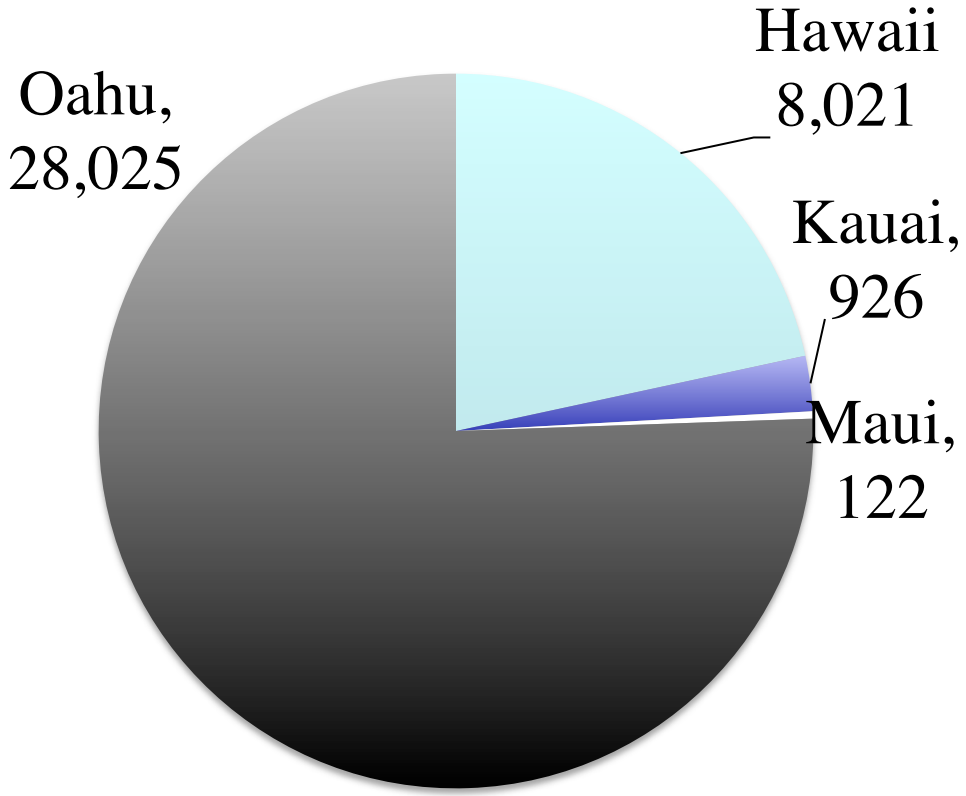


70% of farms use circular cages, most covered with shade cloth other with plastic film.

Others report banana, papaya and coffee intercrops; panax, pigeon pea, madre de cacao (Gliricidia)

If you harvested cacao in 2016, how much did you harvest?

2016 state production was 37,100 pounds of dry bean*

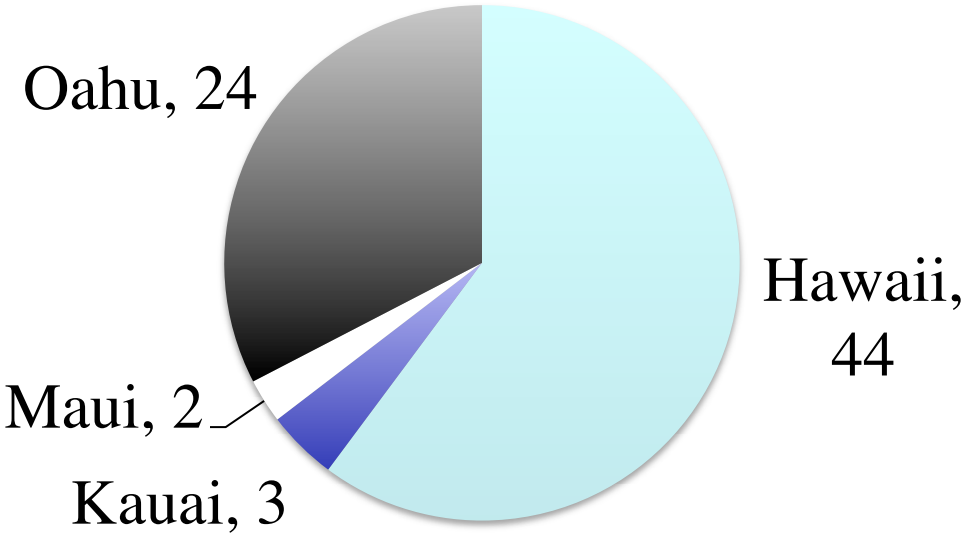


Actual amount is probably larger as farmers' participation is voluntary.

* Dry Bean Equivalents per island

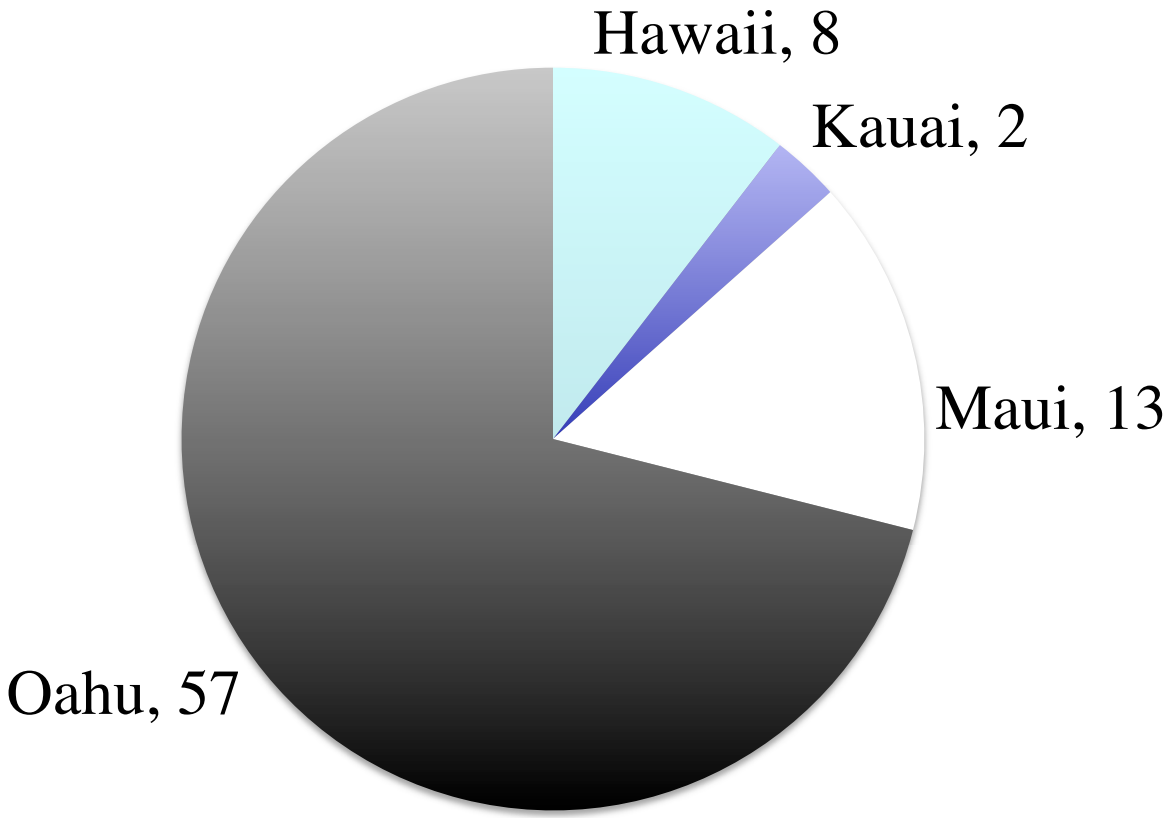
How many acres or trees were harvested in 2016?

73 Acres* harvested in 2016



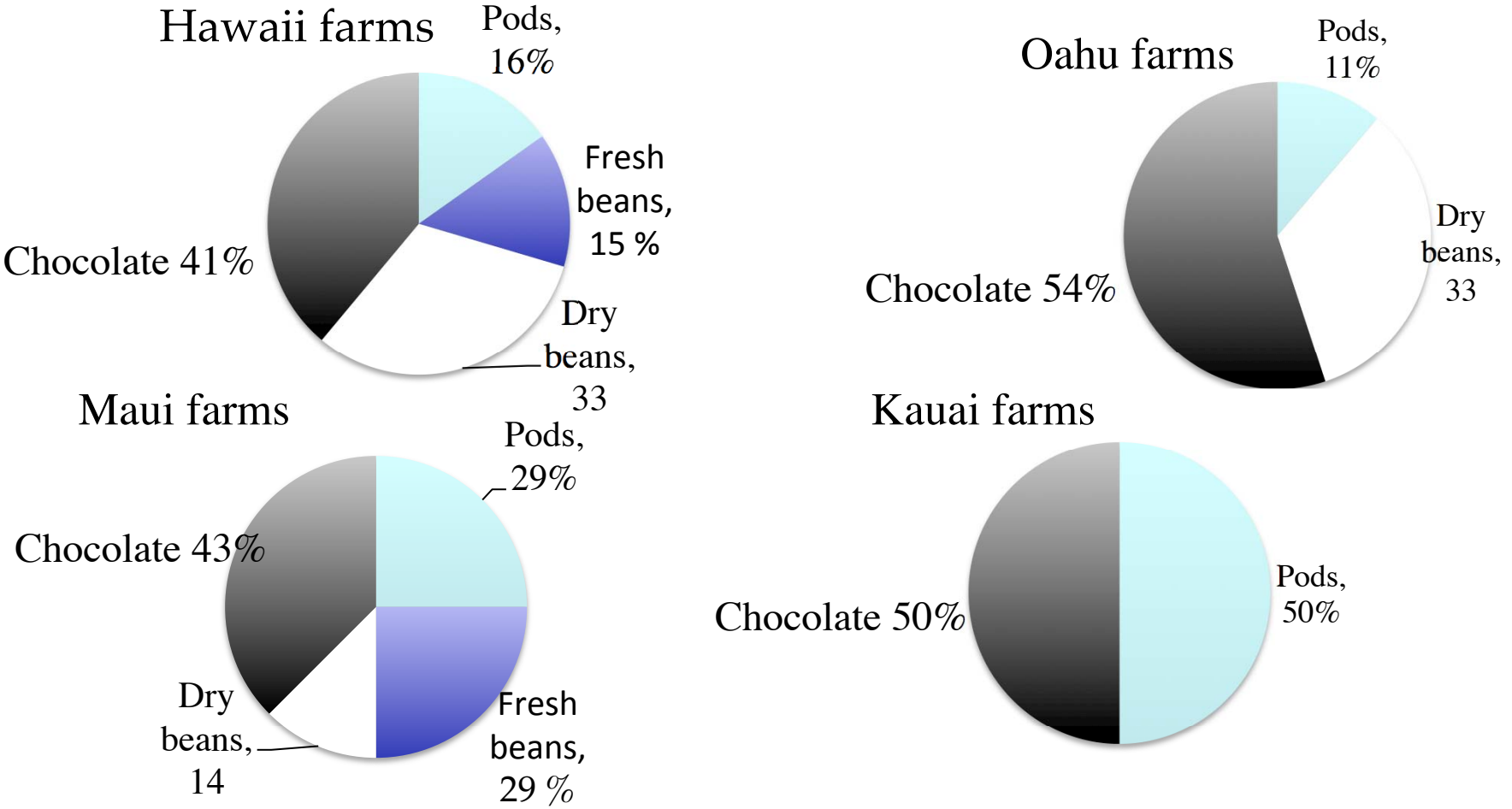
*Farms report acres or number of trees and their spacing. Using the average tree spacing- 544 trees per acre the estimated acreage harvested trees is 73 acre equivalents. Acreage is probably larger as response is voluntary.

How many acres* of cacao will you plant in 2017 ?



*acre equivalents

In five years (2021), how do you expect to sell your cacao?



Percentage calculated as average farm responses and not adjusted for farm size. Chocolate is most preferred, I expect it will be less once farms deal with the labor and regulations.

Farms comment on important issues

Chinese Rose Beetle has been/is a problem, but as of yet I have lost no trees. Controlling pests with out chemicals.

Hilo side of Hawaii island is showing increasing threats from black pod; especially older farms (5-10 yrs).
How to recognize diseases before they become a problem. Fungal diseases that could cause total crop failure managing black pod is becoming a big issue.

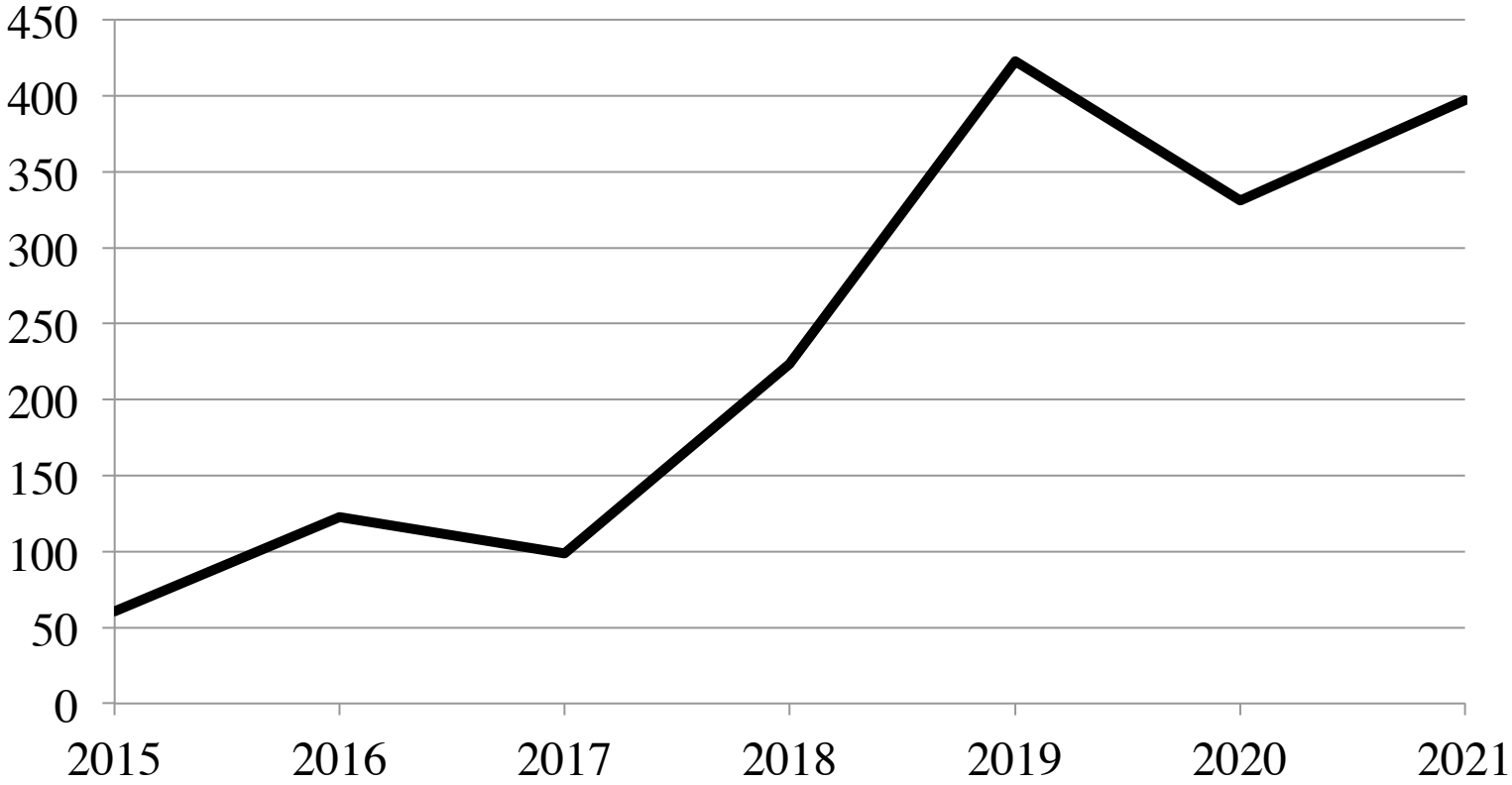
Learn best practices for ferment/dry effectively and consistently

Drying is also a problem because of high levels of rainfall that coincide with peak harvest times.

Need cooperatives for managing, fermenting, drying,

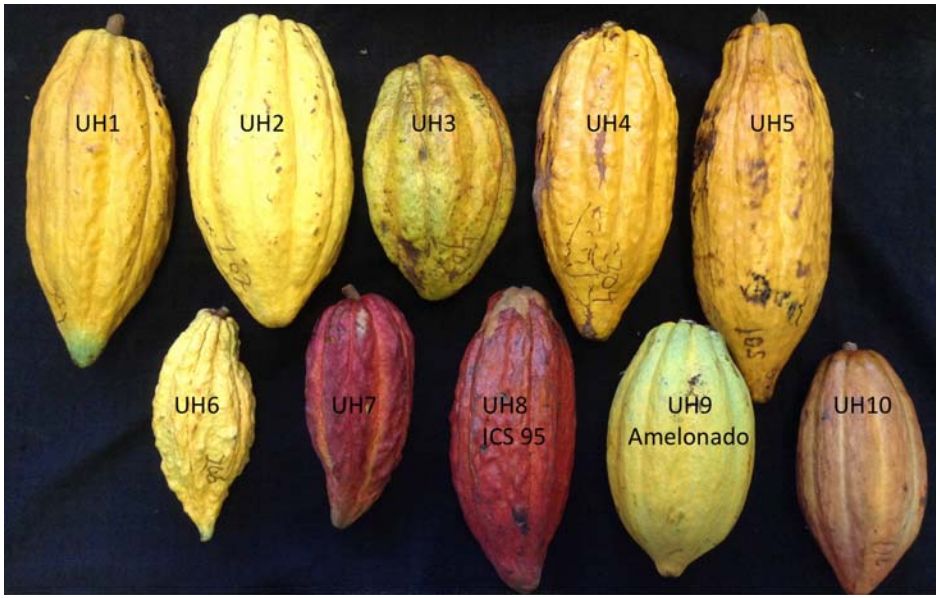
Kauai land usage restrictions

Prediction for Future Acreage



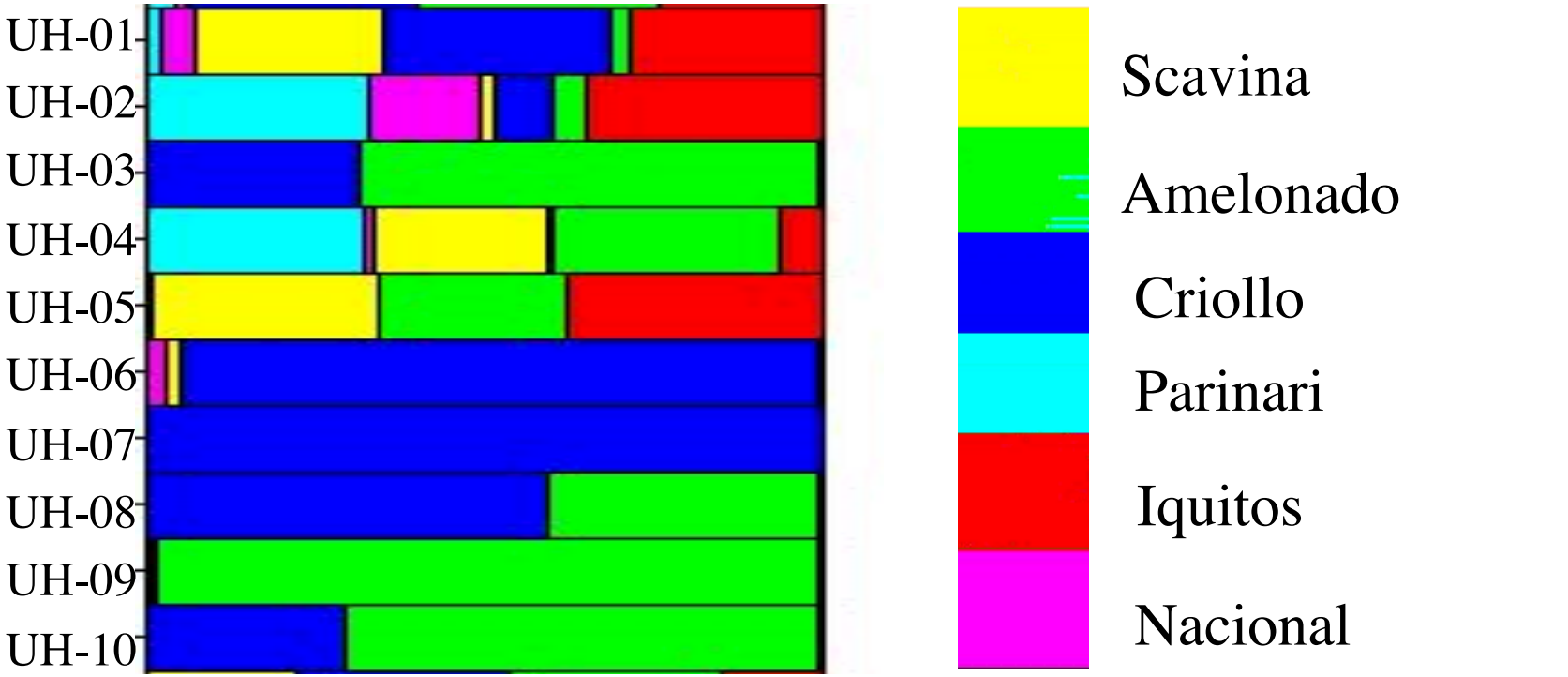
Farmers are asked how much they will plant in 5 years each year. Prediction is as acre equivalents in year of prediction plus the five year prediction. Note 2016 acreage predicted in 2011 was quite close to actual reported for 2016.

CTAHR Cacao Variety Development: 2016 Results and Recommendations



10 selected trees cloned by grafting

Genetic background of the 10 selected trees



Six major races of cacao

Top wedge grafting

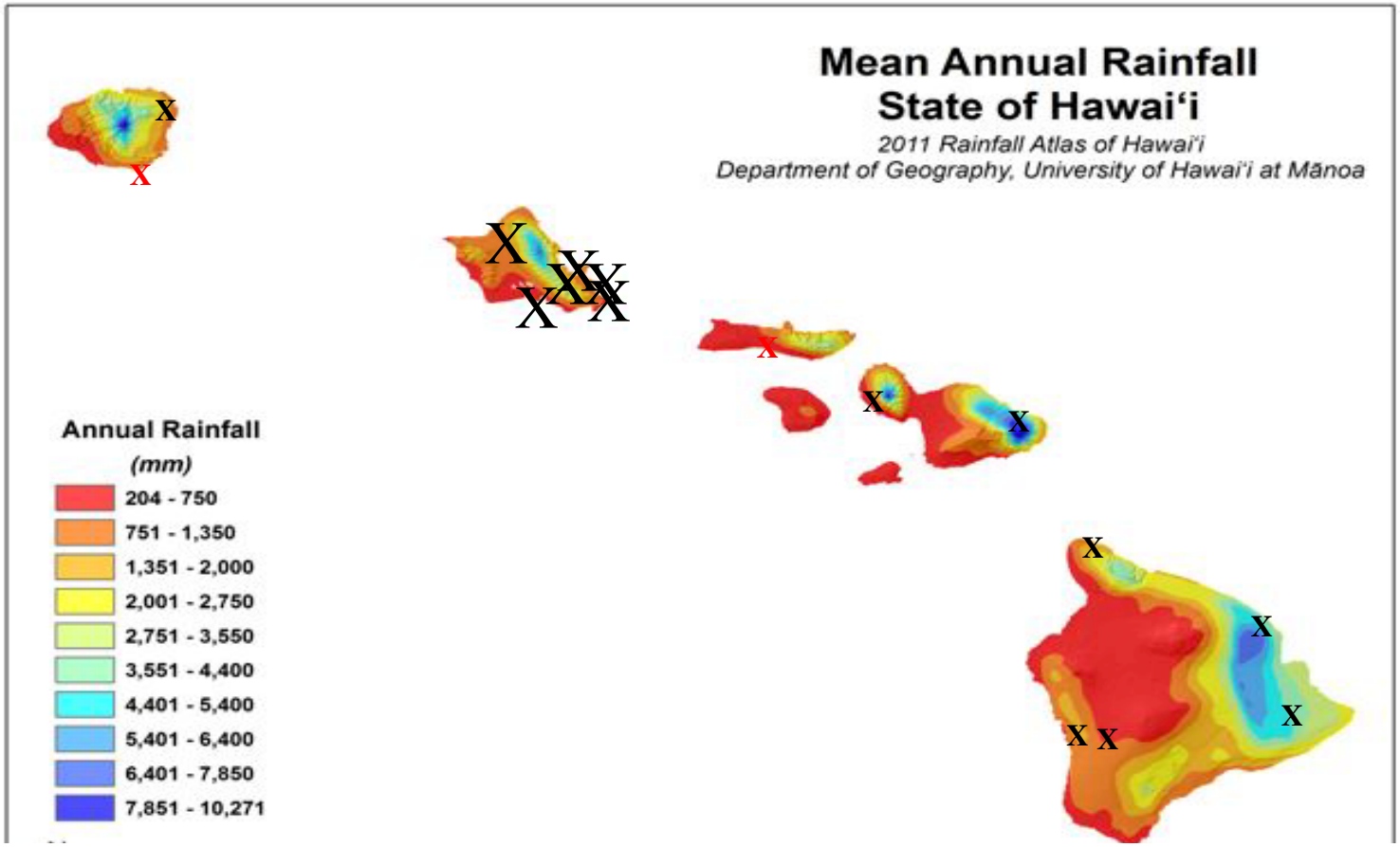
Match scion and rootstock diameter. Graft. Wrap with Parafilm® and cover with plastic bag.

Field grafting requires cap of leaves or paper bag, then recage.

Sealed bags in pans.
Programmed heat increase in fermentery with high humidity.
Drying racks in lab stacked for ambient air drying with fan for 24 hr at 12 h intervals.
Then forced air at 95F at 2 12h intervals and 113F until 7 % seed moisture.

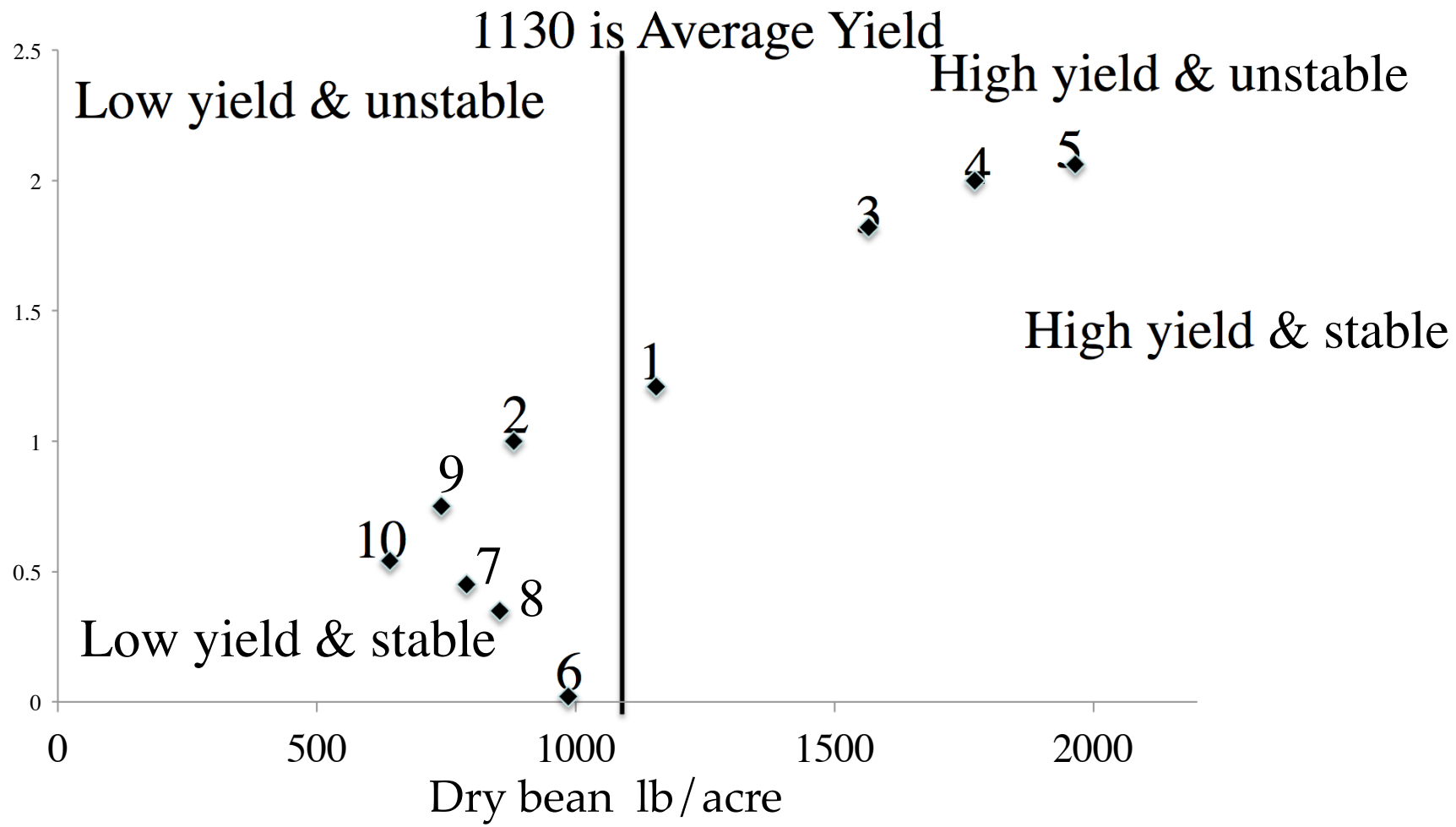
CTAHR Cacao Variety Trial Sites

starting in 2010.



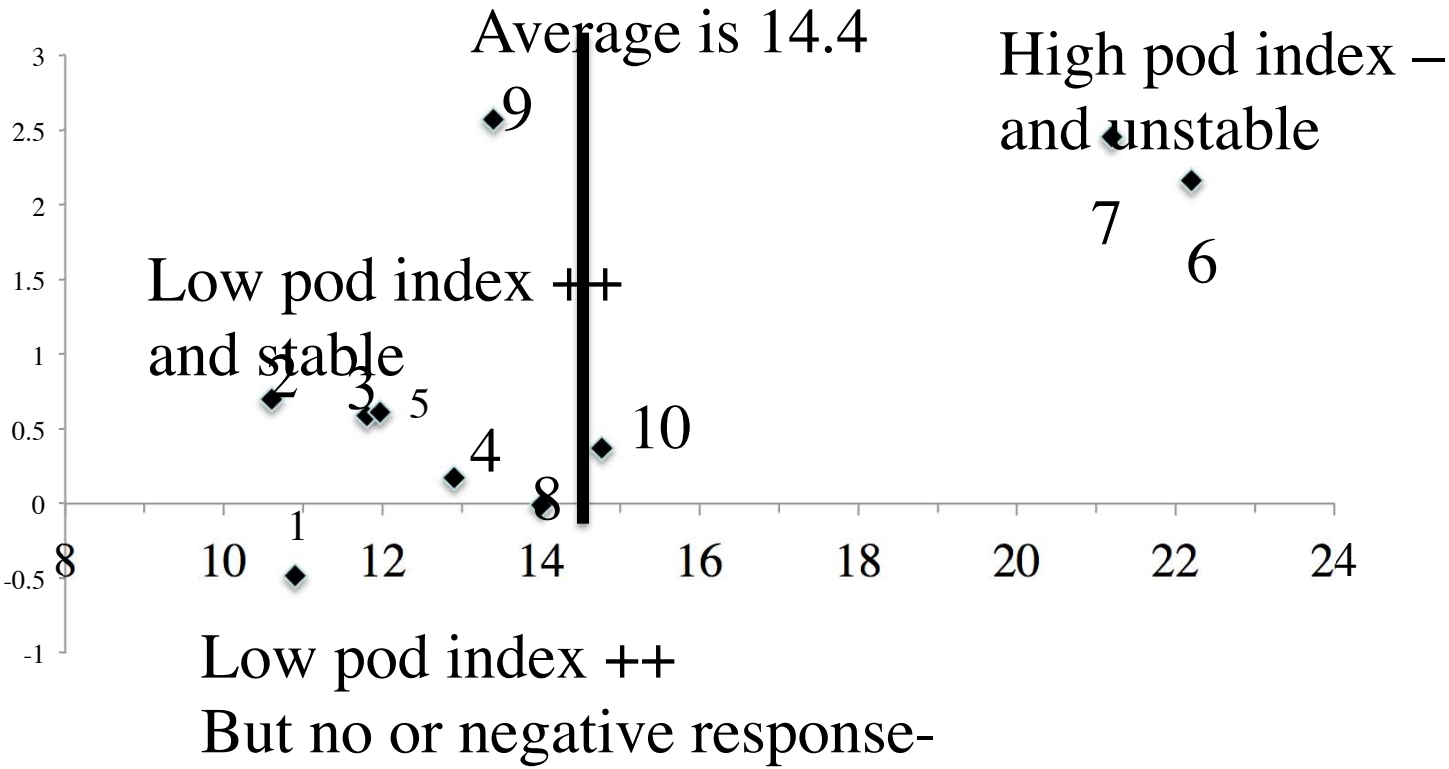
All but Oahu sites were abandoned due to funding issues.

Stability Analysis of Cacao Selections: Yield as pounds of dry bean/acre in 2016



Note: Hawaii selections performed better that international varieties Amelonado and ICS95, but trees are not fully mature yet.

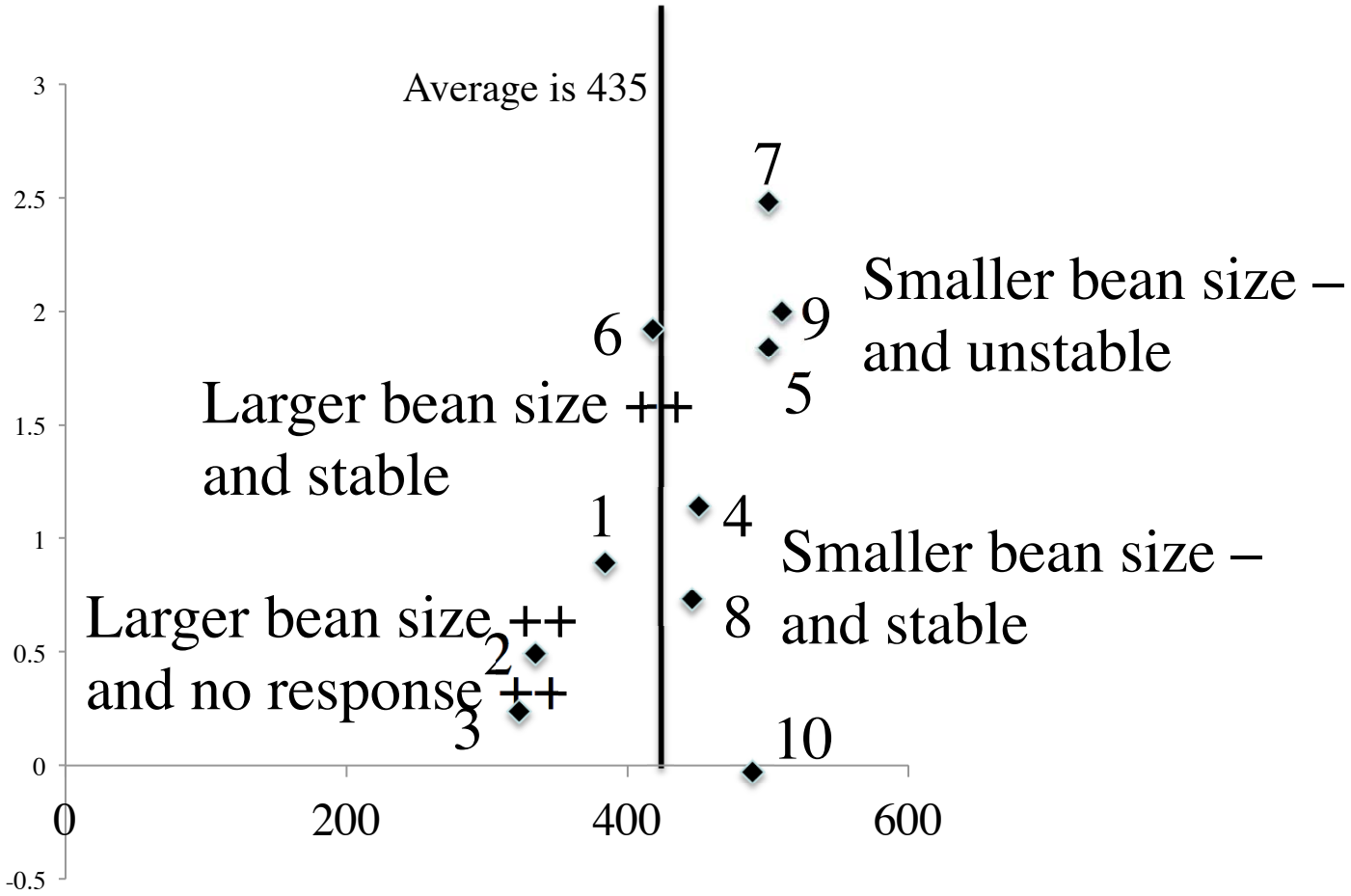
Stability Analysis of Cacao Selections: Pod index-how many pods make a pound of dry beans



Small pod index is good, fewer pods to harvest and crack to get a pound of dry beans

4 and 8 (ICS 95) had eratic response and 9 (Amelonado) while was unstable.

Stability Analysis of Cacao Selections: Dry Bean Size-how many beans in a pound



Large beans (fewer per pound) is good- more nib and less shell.

I recommend UH3 as a grafted tree for planting in Hawaii

This seedling is recommended for planting as a grafted tree.
Six yr old grafted trees average 3.6 lb dry bean per tree (1,600 lb/acre) across 4 sites in 2016. Bean size is good, 1.4 g/bean or 323 dry beans per lb. Pod index is good - 11.8 pods make 1 lb dry bean (26 pods/1 kg dry bean).
Flavor is good.
UH3 is the only seedling in experiment that showed tolerance to Black pod (*Phytophthora palmivora)* in pod inoculation tests in the laboratory of Dr. Janice Uchida. She used the strain of the disease isolated from Big Island.

Students and CTAHR Cacao Variety Development Program

Erik Kling
2007-2008

Jason Myers
2015-2016

Dan O'Doherty
2009-2013

Jeff Caraballo
2013-2014

Yui Fujita
2014-2015

Questions and Comments ?