



United States
Department of
Agriculture

National Institute
of Food
and Agriculture

INVESTING IN SCIENCE | SECURING OUR FUTURE | WWW.NIFA.USDA.GOV

CRATE



CRATE

Center of Rural Agricultural Training & Entrepreneurship

Koon-Hui Wang, J. Sugano, J. Uyeda, T. Radovich, S. Chiang

University of Hawaii at Manoa

<http://www.ctahr.hawaii.edu/WangKH/CRATE.html>



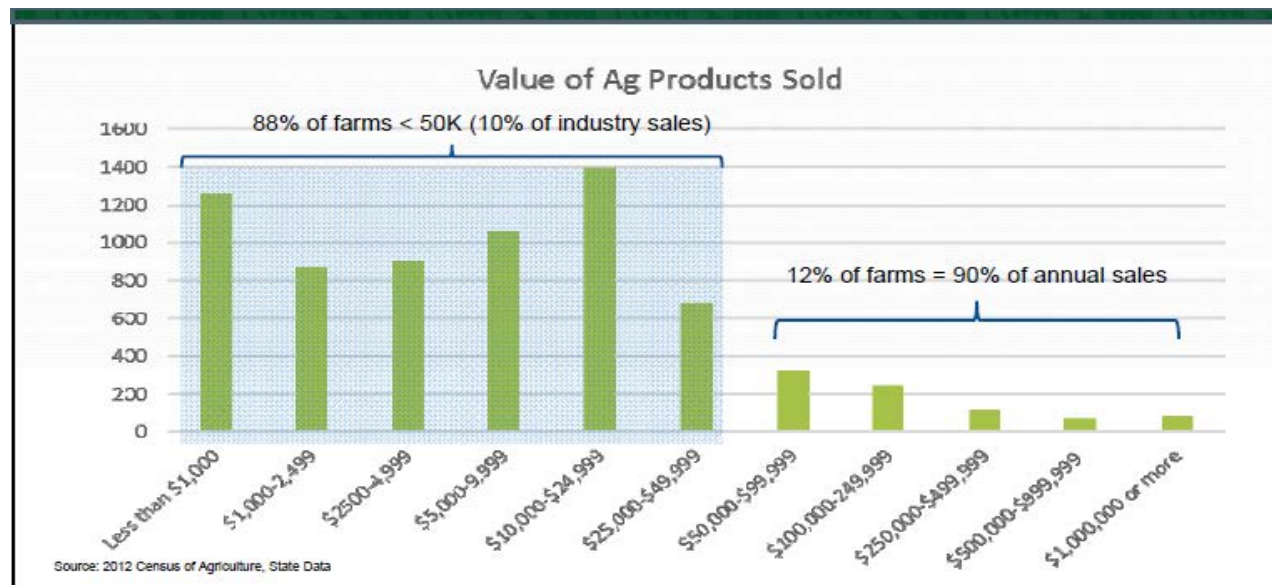
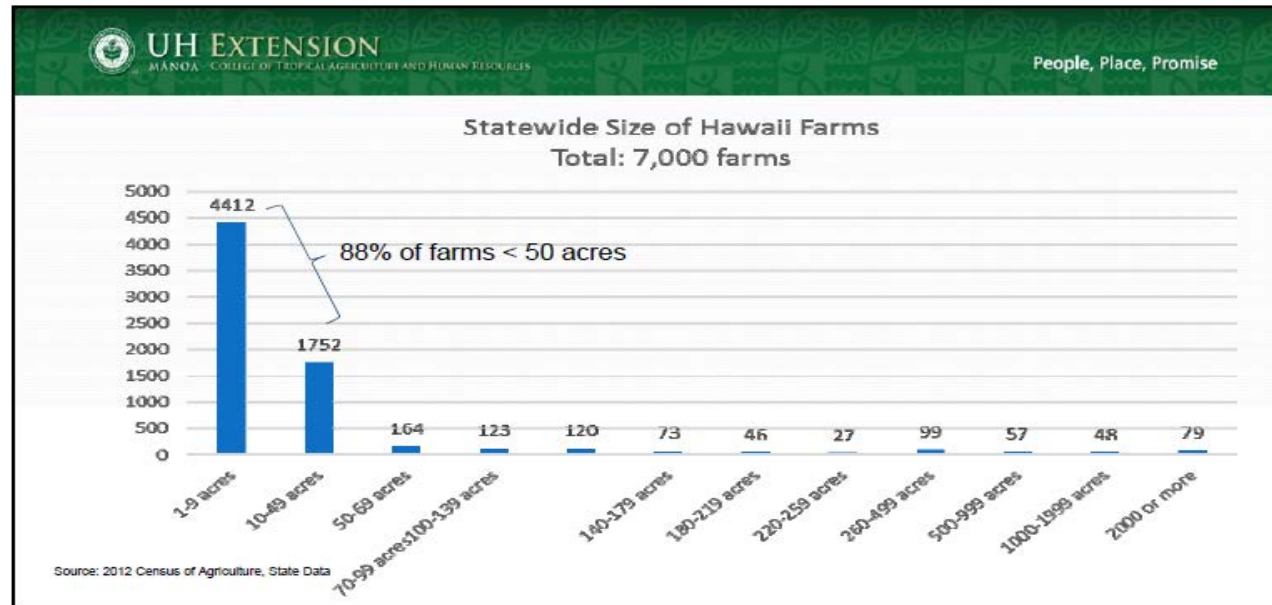
College of Tropical Agriculture and Human Resources
University of Hawaii at Manoa





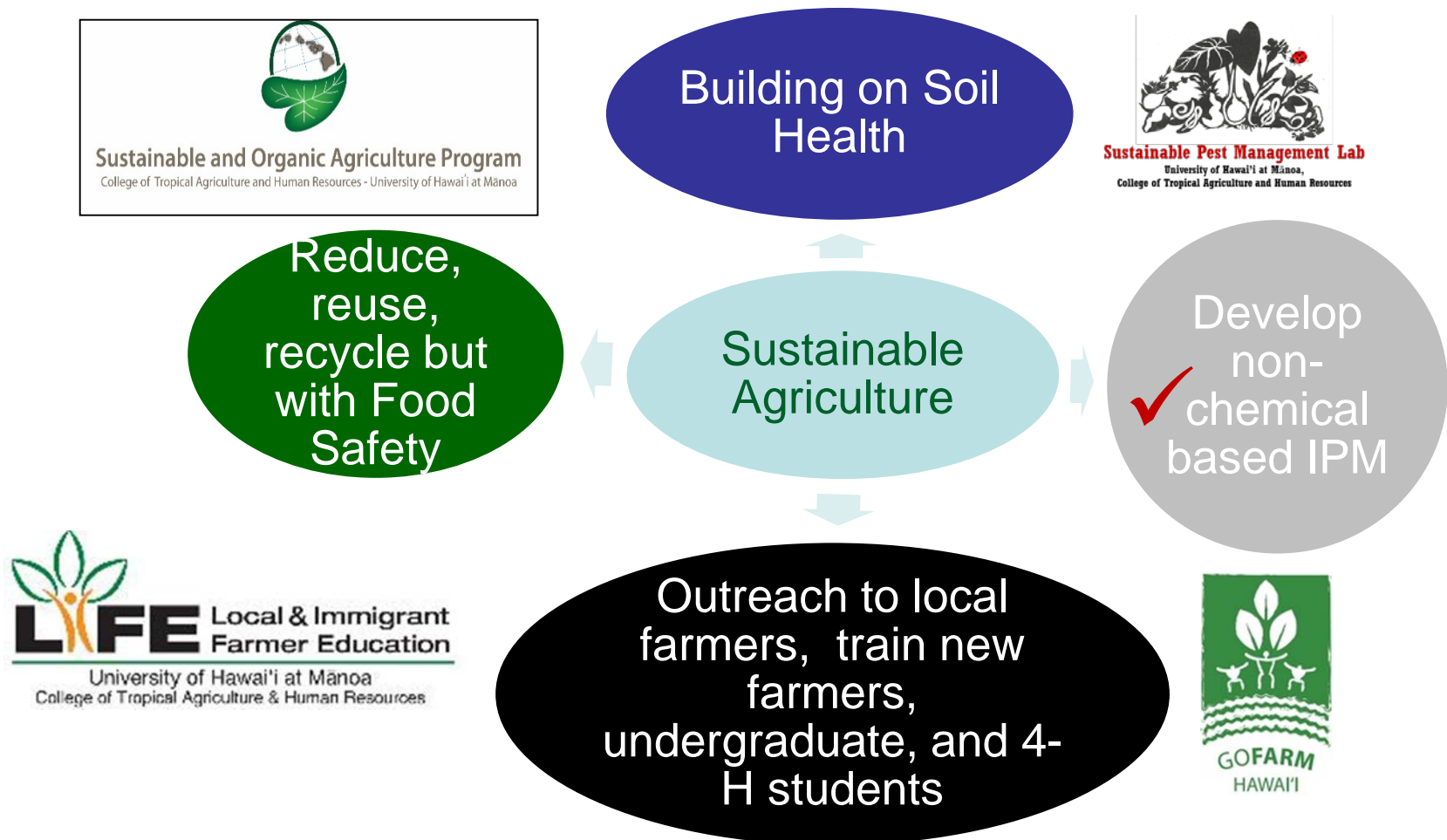
Target Farmers

- Small- & Medium-sized farm's farmers
- New Farmers
- Organic Farmers
- Local & Immigrant farmers
- Vegetable crop growers
- Ag Professional



CRATE OBJECTIVES

How to make local organic farming more profitable and sustainable?



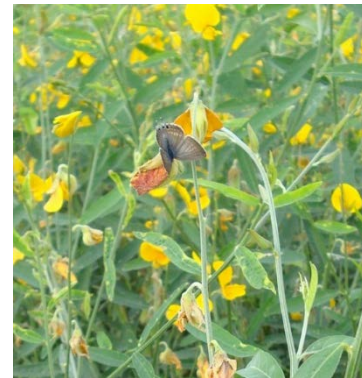
**ENHANCE NATURAL
ENEMIES OF TARGET
PESTS**

INSECTARY PLANTS

Plants that attract insects, either by producing abundant flowers with pollen and nectar for beneficial insects, or by luring insect pests away from the cash crop.



Hoverflies on buckwheat and cilantro



Sunn hemp flowers attracts Lycaenidae butterflies that drawn *Trichogramma* wasps to lay eggs on the Lepidopteran eggs.



Lady beetles on Aweoweo





aphids



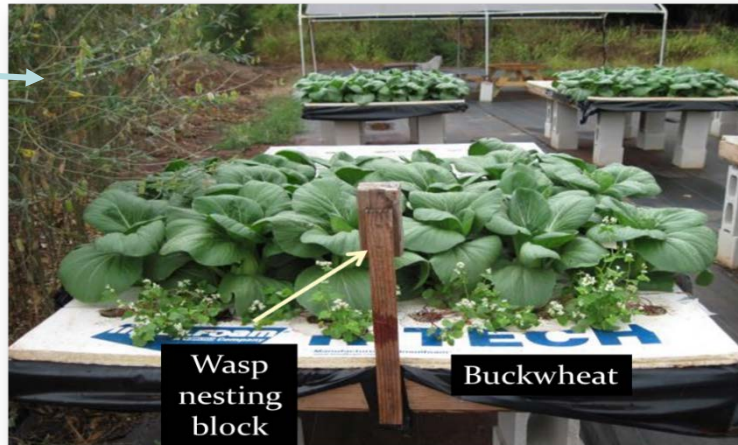
Diamond back
moth (DBM)
larvae



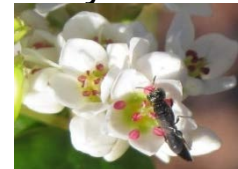
Hoverfly larva
eating aphid

Integrating insectary plants with WASPS NESTING BLOCK

Sunn
hemp
border



Key-hole



Aphid-
collecting
Wasp

This insectary setting reduced aphids and DBM, and resulted in significant pak choi yield than the control treatment.

Biological Control 91: 1-9 (Tavares, Wang et al. 2015)

- <http://www.ctahr.hawaii.edu/WangKH/sustainable-pest.html>

Integrating insectary plants with NO-TILL COVER CROPPING



No-till sunn hemp organic mulch

Leaf miners

Thrips



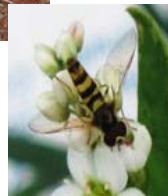
Purple blotch

Cowpea border

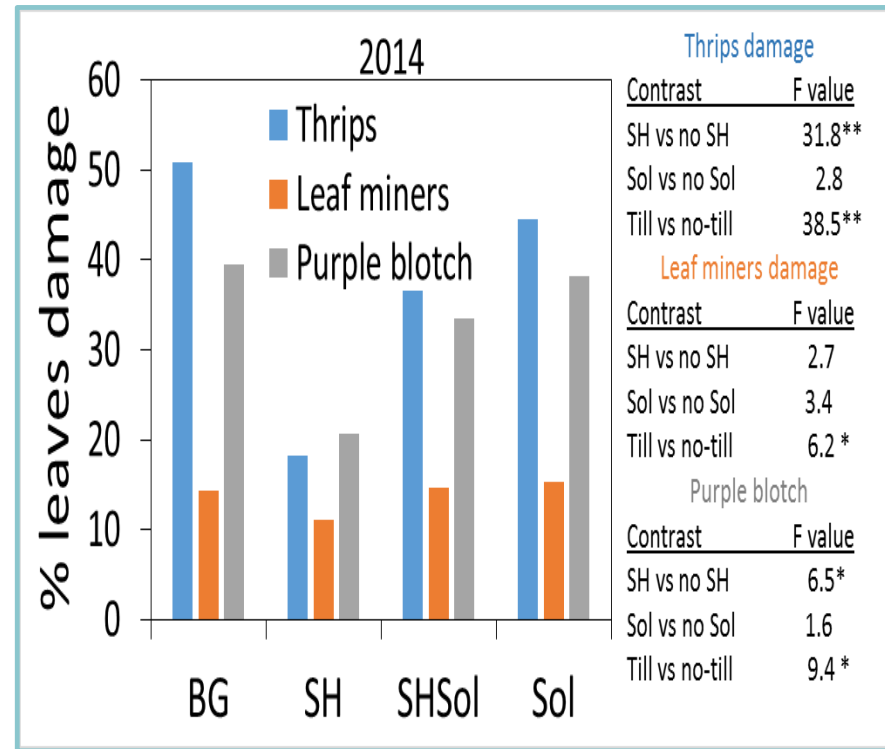


Cowpea border

Buckwheat border



SH = Sunn hemp & insectary borders;
BG = bare ground, Sol = solarization

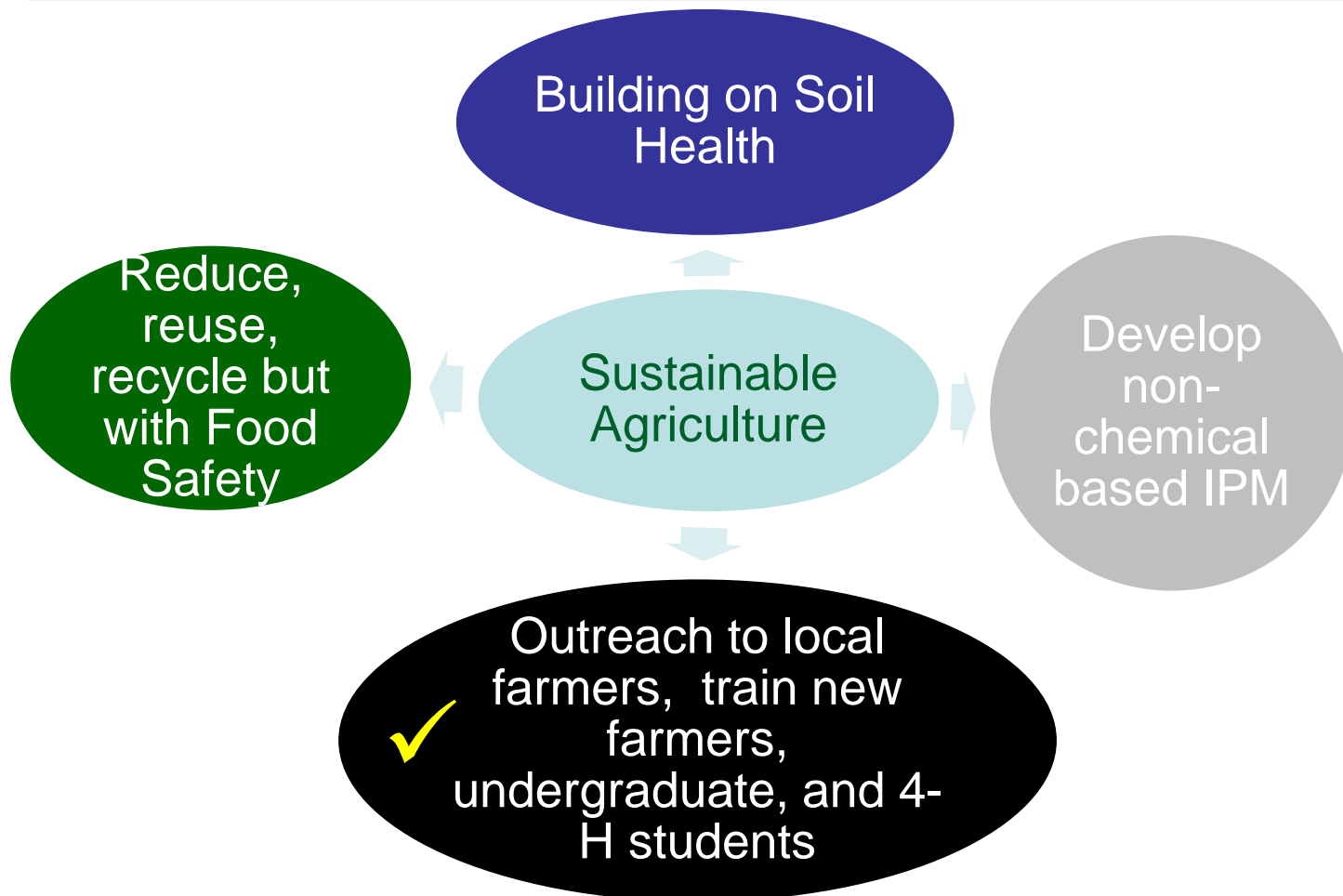


(Agri., Ecosys. Environ 224:75-85)



CRATE OBJECTIVES

How to make local organic farming more profitable and sustainable?





GoFarm Hawaii New Farmers' Training Program

<http://www.gofarmhawaii.org/>



AgSchool
AgProfessional

The flowchart shows a progression from 'Interested in Farming?' to 'Ready to Start Farming?'. Below each step is a box with details: 'AgCurious Windward 2.5 hours', 'AgCurious Intermediate 5 days', and 'AgSchool & AgProfessional 6 months'.

AgIncubator

The flowchart shows a progression from 'Interested in Farming?' to 'Ready to Start Farming?'. Below each step is a box with details: 'AgCurious Windward 2.5 hours', 'AgCurious Intermediate 5 days', 'AgSchool & AgProfessional 6 months', 'AgIncubator 6 months 24 weeks', and 'AgIncubator 24 to 36 weeks 24 weeks'.

CRATE:



AgBusiness

The flowchart shows a progression from 'Interested in Farming?' to 'Ready to Start Farming?'. Below each step is a box with details: 'AgCurious Windward 2.5 hours', 'AgCurious Intermediate 5 days', 'AgSchool & AgProfessional 6 months', 'AgIncubator 6 months 24 weeks', 'AgIncubator 24 to 36 weeks 24 weeks', and 'AgBusiness 18 to 24 weeks 18 to 24 weeks'.

AgProducers

The flowchart shows a progression from 'Interested in Farming?' to 'Ready to Start Farming?'. Below each step is a box with details: 'AgCurious Windward 2.5 hours', 'AgCurious Intermediate 5 days', 'AgSchool & AgProfessional 6 months', 'AgIncubator 6 months 24 weeks', 'AgIncubator 24 to 36 weeks 24 weeks', and 'AgProducers 18 to 24 weeks 18 to 24 weeks'.





United States
Department of
Agriculture

National Institute
of Food
and Agriculture

INVESTING IN SCIENCE | SECURING OUR FUTURE | WWW.NIFA.USDA.GOV

Support Other New Farmers' Training Program



WAHIAWĀ WELCOMES YOU LIVE ● WORK ● PLAY

UH CTAHR'S EFFORTS TO SUPPORT THE
WAHIAWĀ VILLAGE AGRICULTURAL DEVELOPMENT PLAN
MAY 2015

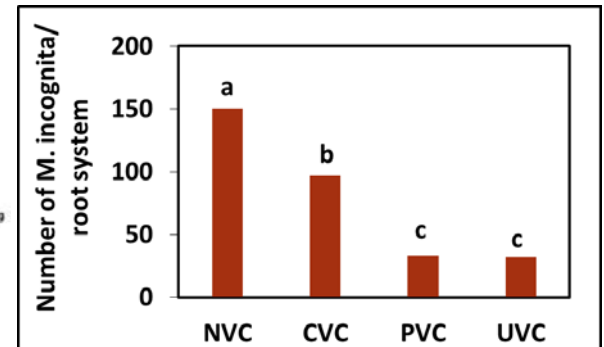
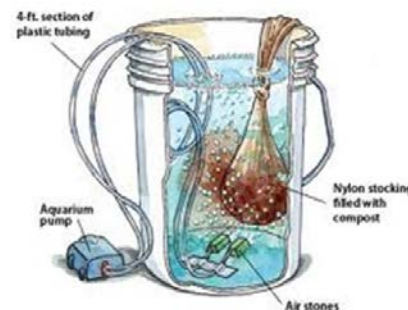


Vermicompost



VCT prepared from uncured VC induced host plant resistance against nematode and insect pests.

Vermicompost Tea (VCT)



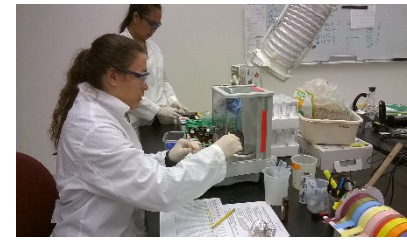


Education: Hands-on Training

University of Hawaii College students



High School students (4H) KOREAN NATURAL FARMING/SOIL INOCULUM





Extension & Out Reach

Out Door Training Class Rooms



Vegetable Crop Mini Conference



Agriculture Day @ the State Capitol





<http://www.ctahr.hawaii.edu/WangKH/CRATE.html>

≡ YouTube Videos



- HOME
- BANANA IPM
- BANANA MINI-CONFERENCE
- BUTTERFLY GARDEN
- CRATE
- COVER CROPS
- INSECTARY PLANTS
- KOREAN NATURAL FARMING
- MUSHROOM COMPOST
- NEMATODE PREDATORS
- NEMATODE TRAPPING FUNGI
- SOIL HEALTH MANAGEMENT
- SUSTAINABLE PEST MANAGEMENT PROJECTS

CRATE: Center for Rural Agricultural Training and Entrepreneurship



CRATE
CENTER FOR RURAL AGRICULTURAL TRAINING AND ENTREPRENEURSHIP

Project

Wang, K.-H., A. Pant, T. Radovich, J. Sugano, C. Tamaru, E. Fox, J. Uyeda, S. Chiang, C. Chan-Halbrandt. 2013-2016. Center of Rural Agriculture Training for Entrepreneurship (CRATE) for the Pacific. NIFA AFRI AER&C (Small and Mid-Size Farms Program)

Presentations

1. Wang, K.-H., J. Sugano, J. Uyeda, S. Chiang, J. Kam, T. Radovich, and S. Fukuda. *Organic and Sustainable Pest Management Options*. Oahu Mini-Vegetable Conference at Turtle Bay May 21, 2016.

CRATE Posters

- [Cover Crop Plant Available Nitrogen \(PAN\) Calculator](#)
- [Hot Water Treatment for Arthropod Pests Management](#)
- [Insectary Plants for Organic IPM](#)
- [Use of Oyster Mushroom Compost for Nematode Management](#)
- [DIY Screenhouses](#)
- [Enhancing Soil Health through the introduction of Beneficial Soil Microorganisms](#)
- [Non-chemical Approach for Mite Suppression on Tea Plants: Vermicompost Tea Drenching](#)
- [Plant Available Nitrogen and Soil Health Enhancement of Cool Season Cover Crops in High Land Area in Hawaii](#)

CRATE on-line Classroom

- [Insectary Settings for Arthropod Pest Management Part 1: https://youtu.be/BsN_3lC35wg](https://youtu.be/BsN_3lC35wg)
- [Insectary Settings for Arthropod Pest Management Part 2: https://youtu.be/1stOru5l-a0](https://youtu.be/1stOru5l-a0)
- [Soil slaking and infiltration tests: http://www.hawaiiinewsnow.com/story/27943343/take-advantage-of-the-upcoming-free-workshops-on-soil-health-awareness](http://www.hawaiiinewsnow.com/story/27943343/take-advantage-of-the-upcoming-free-workshops-on-soil-health-awareness)
- [The Benefits of Vermicomposting: http://youtu.be/7pQBWyQYum0](http://youtu.be/7pQBWyQYum0)
- [Sprayer Calibration Using the 1/128th Method for Motorized Back-Pack Mist Sprayer Systems: http://youtu.be/y_Lrx2OmABc](http://youtu.be/y_Lrx2OmABc)
- [Introduction to Home Aquaponics: http://www.youtube.com/watch?v=0-MJRB18T_o](http://www.youtube.com/watch?v=0-MJRB18T_o)



What's New? For Students **Hānai'Ai** The Food Provider -- June | July | August 2015

Extension Articles

CRATE: Center for Rural Agricultural Training and Entrepreneurship

In this column, the CRATE team will publish recent project activities that will help local farmers to explore competitive and economically viable organic crop production methods.



Cover Crop Plant Available Nitrogen (PAN) Calculator

Koon-Hui Wang, Archana Pant, Theodore Radovich, Shova Mishra, Shelby Ching, Jeana Cadby, UH-CTAHR

Leguminous cover crops can contribute significant amount of nitrogen to crop production. However, farmers need a better tool to accurately estimate the nitrogen contribution from legumes so as to precisely reduce fertilizer rates. A simple calculator to address this issue was developed for Idaho and Oregon farmers with high success rate. This project is adapting this concept for tropical climates and soil types in the Pacific Islands. [View poster here.](#)



FMI: Koon-Hui Wang, email: koon-hui@hawaii.edu



Hot Water Treatment for Arthropod Pests Management

Koon-Hui Wang, Megan Manley, Donna Meyer, Jari Sugano, Jorason Uyeda, UH-CTAHR

Hot water treatments have been shown effective to free various plant materials (including potted plants, plant suckers, tropical cut flowers) from arthropods and other invertebrate or vertebrate pests particularly for export materials against quarantine pests. The objective of this project is to examine the potential of hot water treatment as a non-chemical based approach to manage arthropod pests on field grown crops. Two cropping systems targeting on different key arthropod pests were examined: 1) tea (*Camellia sinensis*) infested with red, broad and 2-spotted spider mites (Acari: Tarsanemidae) and scale insects (Homoptera: Diaspididae); and 2) tomato (*Solanum lycopersicum*) infested with silverleaf whiteflies (*Bemisia argentifolii*). [View poster here.](#)



FMI: Koon-Hui Wang, email: koon-hui@hawaii.edu



Insectary Plants for Organic IPM

Koon-Hui Wang, Adam Park, Shelby Ching, Shova Mishra, Jari Sugano, Jensen Uyeda, Jane Tavares, and Mansol Quintanilla, UH-CTAHR

Insectary

- https://www.youtube.com/watch?v=BsN_3lC35wg&feature=youtu.be
- <https://www.youtube.com/watch?v=1stOru5l-a0&feature=youtu.be>
- https://www.youtube.com/watch?v=kCleYZ_zwpM

Vermicompost

- <http://youtu.be/7pQBWyQYum0>

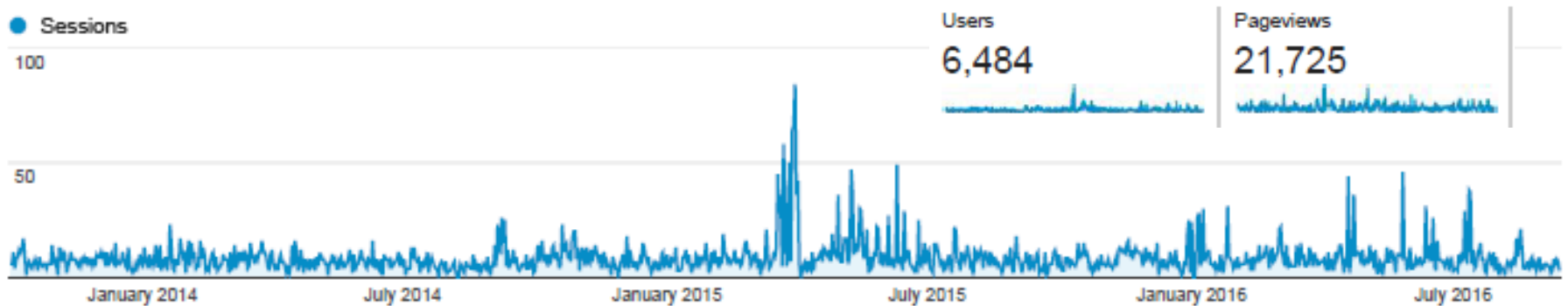
Soil Health

- <http://www.hawaiiinewsnow.com/story/27943343/take-advantage-of-the-upcoming-free-workshops-on-soil-health-awareness>



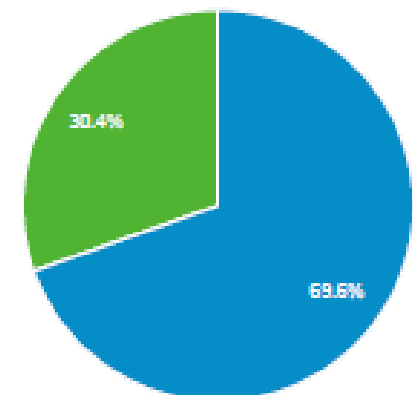
Google Analytical of CRATE Webpage

(Oct 1, 2013-Sept 13, 2016)



City	Sessions	% Sessions
1. Honolulu	1,383	14.99%
2. (not set)	974	10.56%
3. Hilo	183	1.96%
4. (not set)	142	1.54%
5. Los Angeles	139	1.51%
6. Kahului	78	0.85%
7. Kailua	76	0.82%
8. Kailua-Kona	71	0.77%
9. Bengaluru	65	0.70%
10. Quezon City	61	0.66%

■ New Visitor ■ Returning Visitor





Project Evaluation

Survey Conducted at a Pest Management Mini conference (5/24/16) organized by CRATE Team	Strongly agree (%)
1. Presentations are very informative and useful for edible crop production.	84
2. Event is well organized (time, venue, invited speakers, exhibition booth, activities).	92
3. You are willing to adopt some of the new techniques you learned from this conference.	89

General comments: The event was well organized, very informative, hope to have similar event every year.



United States
Department of
Agriculture

National Institute
of Food
and Agriculture

INVESTING IN SCIENCE | SECURING OUR FUTURE | WWW.NIFA.USDA.GOV

Questions!

