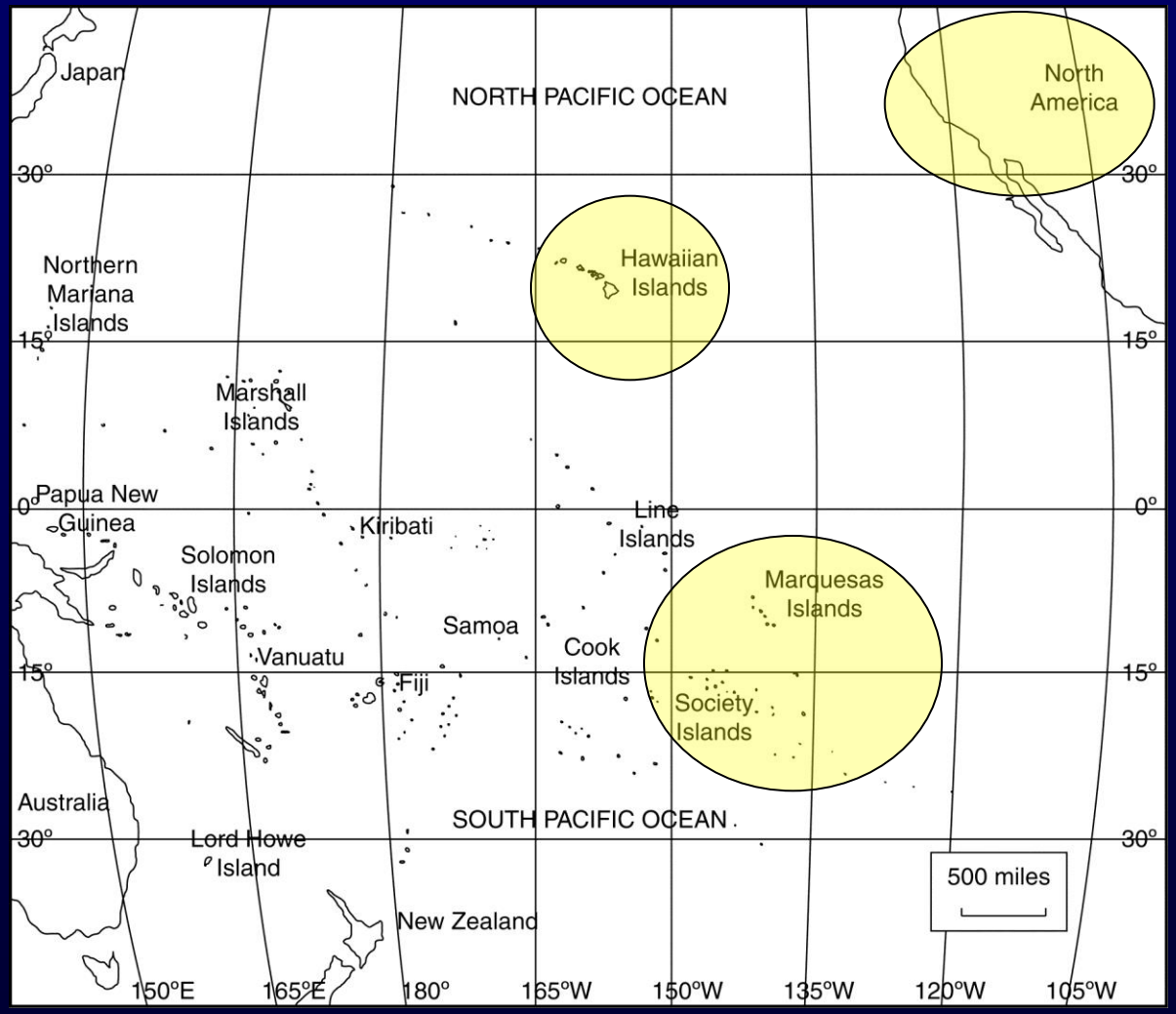
IR4 Support of Biopesticides in Tropical Agriculture

Roger I. Vargas
United States Department of Agriculture
Agricultural Research Service
Daniel K. Inouye
U. S. Pacific Basin Agricultural Research Center
64 Nowelo St. Hilo, HI 96720
Roger.vargas@ars.usda.gov

IR4 Biopesticides Meeting
Atlanta, Georgia
September 10, 2014

Area-Wide Programs in the Pacific Basin



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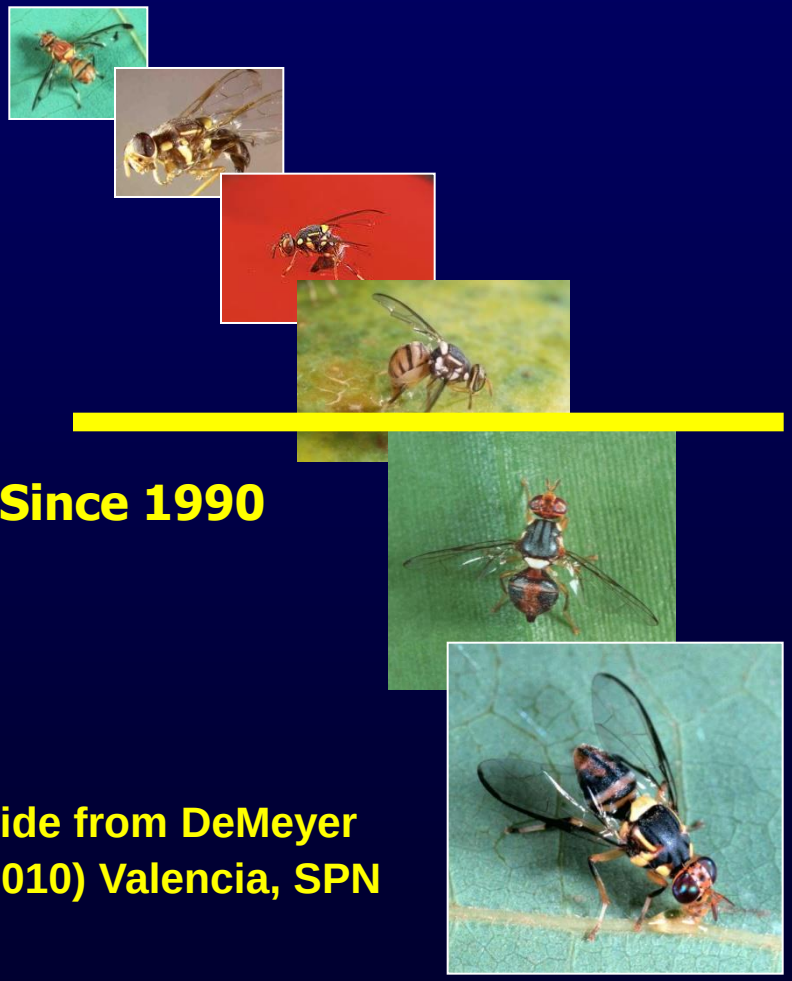
Bactrocera: Background

- Genus of at least 500 species
- Attack a wide range of fruits in the tropical and warm temperate regions of the Old World.
- Most species are found in tropical Asia, Australia, and the South Pacific
- Spreading throughout the world at an alarming rate.

Recent Invasions



Since 1990

Slide from DeMeyer (2010) Valencia, SPN

Date	Invasive species	Area Invaded
1895	*Bactrocera cucurbitae*	Hawaii
1928	*Bactrocera kirki*	Tahiti
1942	*Bactrocera cucurbitae*	Mauritius
1945	*Bactrocera dorsalis*	Hawaii
1969	*Bactrocera tryoni*	New Caledonia
1975	*Bactrocera carambolae*	French Guyana, Guyana
1970s	*Bactrocera tryoni*	French Polynesia
1970s	*Bactrocera xanthodes*	Cook Islands
1983	*Bactrocera latifrons*	Hawaii
1987-1991	*Bactrocera zonata*	Mauritius, Reunion
1993	*Bactrocera carambolae*	Surinam
1995	*Bactrocera papayae*	northern Australia
1996	*Bactrocera dorsalis*	Tahiti
1997	*Bactrocera oleae*	Reunion
1998	*Bactrocera oleae*	USA
1998	*Bactrocera xanthodes*	French Polynesia
1998	*Bactrocera zonata*	Egypt
1999	*Bactrocera cucurbitae*	Seychelles
2003	*Bactrocera invadens*	East Africa
2006	*Bactrocera latifrons*	East Africa

Brief History of Hawaii Area-Wide Pest Management Project

- Hawaii program initiated by ARS in 1999.
- Partnership with UH and HDOA.
- Included research, education, and assessment components
- Goal was to transfer environmentally sound sustainable technology to farmers
- Reduce the use of OP insecticides
- Funded for 10 yrs, and then carried on by cooperators and growers.

Host Range

Fruit flies attack over 400 species of fruit and vegetables

Peach

Citrus

Pumpkin

Loquat

Cantaloupe

Persimmon

Soil Drenches

Population Monitoring

Field Sanitation (1)

Protein Bait (2)

Male Annihilation (3)

Sterile Insects

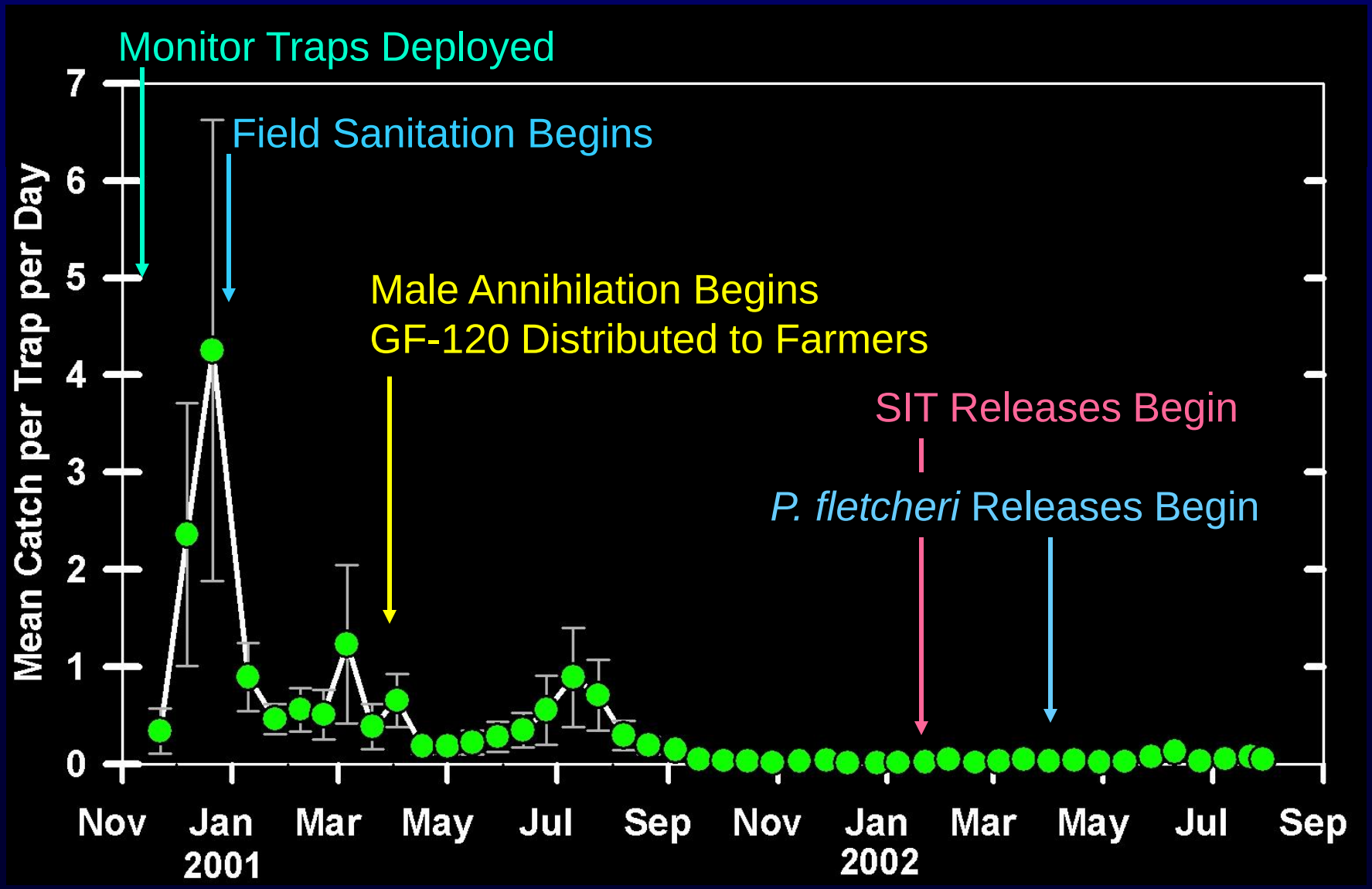
Research

Education

Assessment

Area Wide **Integrated Pest Management** Components

Area-Wide IPM Approach



Major Technical Accomplishments

- Multi-agency collaboration
- International collaboration
- Transfer of IPM approaches to farmers.
- Transfer of New Technologies to Farmers:
- 1) New monitoring methods.
- 2) Replacement of cover sprays with spot GF-120 NF Naturalyte Fruit Fly Bait applications.
- 3) New male annihilation approaches.

http://www.fruitfly.hawaii.edu

State and Federal EPA Registrations

- Prior to this program, no chemicals were registered in the United States specifically for the suppression of fruit flies.

- The AWPM program was instrumental in obtaining the first Hawaii research permits and then assisted in the registration process with state and federal authorities.

AWPM New Product Registrations

Table 2: Registration of Agricultural Chemicals through Hawaii AWPM Fruit Fly Program for Use against Tephritid Fruit Flies in Hawaii*

Date of Reg.	EPA Reg. No.	Hawaii Licensing No.	Product	Source
Aug. 22, 2000	HI SLN Reg. HI-000003	9786.135	GF-120 Fruit Fly Bait	Dow AgroSciences LLC.
Dec 18, 2002	62719-498	9786.234	GF-120 Naturalyte Fruit Fly Bait supplemental label	Dow AgroSciences LLC
May 23, 2003	8730-50	9628.6	Vaportape II™	Hercon Environmental Inc.
June 5, 2006	62719-498	9786.234	GF120 Naturalyte Fruit Fly Bait all crops supplemental label	Dow AgroSciences LLC
Sep. 20, 2007	7969-253	9131.131	Amulet™ C-L w/fipronil stations	BASF
Oct. 3, 2007	36638-42	9721.4	Cue-lure plug in plastic matrix w/o toxicant	Scentry Biologicals Inc.
Oct. 26, 2007	81325-3	8637.1	Methyl eugenol short lure in plastic matrix	Farma Tech International Corp
Dec. 11, 2007	36638-41	9721.3	Methyl eugenol cone in plastic matrix w/o toxicant	Scentry Biologicals Inc.
June 2008	62719-42	9786.282	Sprayable SPLAT-MAT with methyl eugenol and spinosad	Dow AgroSciences LLC/ISCA Technologies


DO NOT REUSE CONTAINER
Dow AgroSciences
GF-120 NF Naturalyte*
Fruit Fly Bait
For selective attractance and control of multiple species of tephritid fruit flies infesting various tree, fruit, nut, vine and vegetable crops and ornamentals, and on non-crop vegetation which may serve as resting sites.
Active Ingredients:
spinosad (a mixture of spinosyn A and spinosyn D) 0.02%
Inert ingredients: includes water, sugars and attractants 99.98%
Total 100.00%
Ready to use formulation.
U.S. Patent No. 5,362,634 and 5,496,931
OMRI
Listed by the Organic Materials Review Institute (OMRI) for use in organic production.
Keep Out of Reach of Children
CAUTION
PRECAUCION
Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)
Refer to back panel for additional information.
Notice: Read the entire label. Use only according to label directions. Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.
In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.
AVOID FREEZING
EPA Reg. No. 62719-498
0A
49
EPA Est. 67545-AZ-001; 5905-GA-01
Supercripts correspond to places 7 & 8 of lot number.
900-009774 / 00226224
*Trademark of Dow AgroSciences LLC
Dow AgroSciences LLC •
Indianapolis, IN 46268 U.S.A.
Insecticidal Bait
Net Contents 1 gal
(01) 0 06 62974 44541 8
UL07160A21


•STATIC™-Spinosad-ME
•(aka SPLAT-MAT-Spinosad ME)

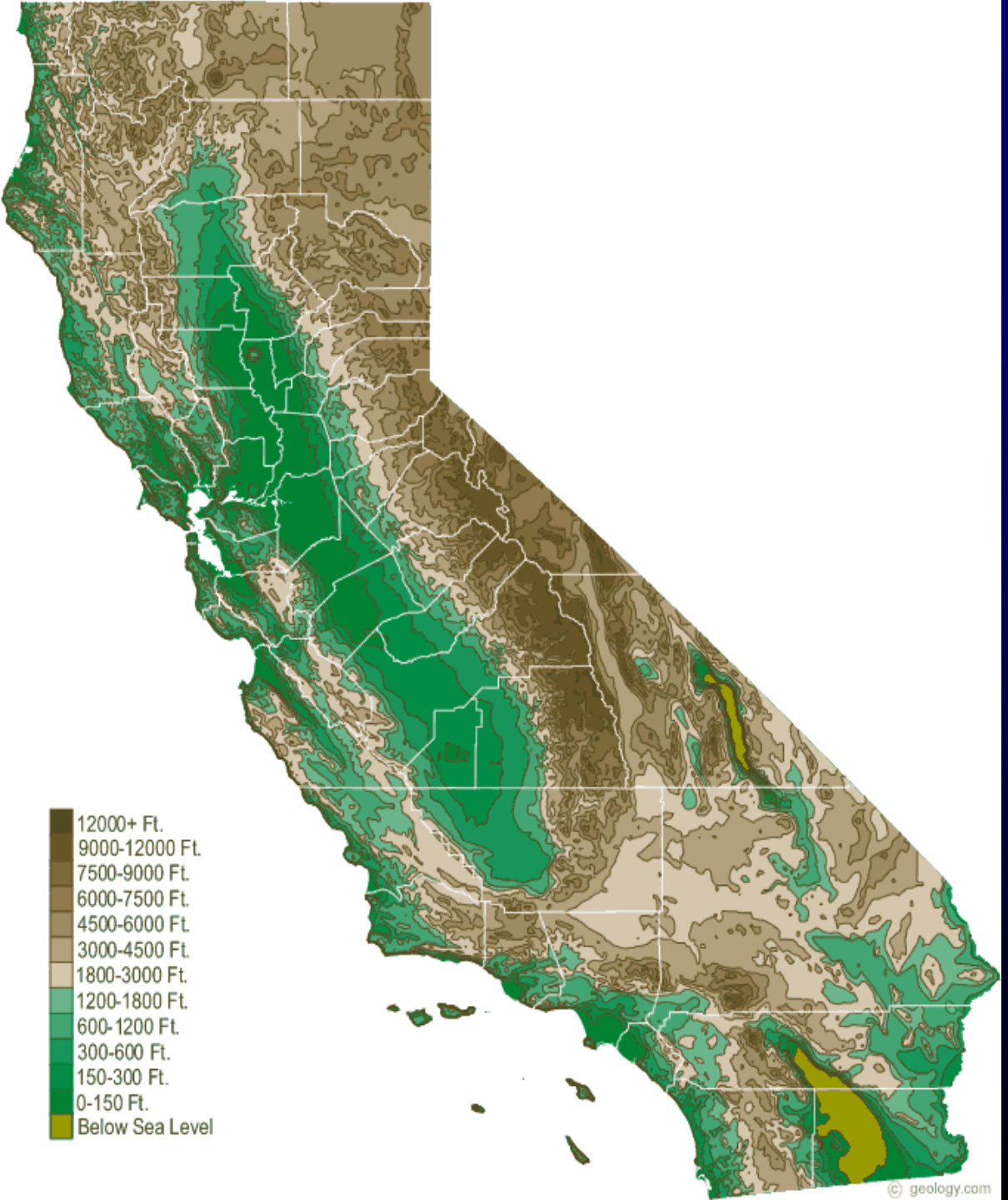
More Benefits than Costs

- AWPM program impacted almost 700 farms on all the major islands with 2500 cooperators
- Program made major economic contributions to agriculture in Hawaii and instigated the growing of a greater diversity of crops.
- By allowing farmers to make significant cuts in pesticide use, the program helped improve Hawaii's environment and sustain open space, which contributed to maintain the islands' tourism.
- The program also led to a significant increase in the number of commercial farms.
- In addition, existing farms added crops or revived some previously phased out due to fruit fly problems.

Regional Impact

- **Suppression of fruit flies in Hawaii also had benefits in other parts of the United States.**

- **Most of the technologies used to combat fruit flies on the U.S. mainland were developed in Hawaii. New technologies have direct application to eradication programs in California and Florida.**



Current Research in California & Florida:

- **STATIC-Spinosad-ME (aka Splat-Mat-ME Spinosad)**
- **Solid Trilure Detection Dispensers**
- **Reduced Risk Soil Drenches**
- **Foliar Insecticide Treatments**

Overall Objectives

Since 1960 *B. dorsalis* has been detected in California in 44 of the last 50 years with over 90 eradication programs.

Currently, liquid lures and naled are the standard for eradication programs.

Over the last 5 years we have developed a reduced risk replacement for liquid lure/insecticide mixtures and Min-u-gel-naled-ME/C-L treatments in California and Florida.

Min-U-Gel ME MAT Treatments

“SPINOSAD”

Spinosad is an aerobic fermentation product of the soil bacterium *Saccharopolyspora spinosa*. It uniquely combines the efficacy of synthetic products with the benefits of biological insect pest control products.

DOW®

Dow AgroSciences


SPLAT Formulated for
Sprayable MAT Applications


STATIC™-Spinosad-ME
(aka SPLAT-MAT-Spinosad ME)

Acknowledgements

- IR-4 Program
- University of Hawaii Cooperative Extension Service
- Hawaii Department of Agriculture
- California Department of Food and Agriculture
- Florida Department of Agriculture
- Dow AgroSciences LLC
- ISCA Technologies
- FarmaTech International


Questions??