Management of Melon Fly Using Pest Behavior & Environmentally Benign Attract and Kill Technologies

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A Cooperative Project Between USDA-ARS, UH CTAHR, Hawaii DOA, Hawaii's Growers and Communities

USDA ARS Area-Wide Pest Management Program

Outcomes Sought:

- **Suppression**
- **Sustainable**
- **Environmentally friendly**

The Melon Fly Problem

- Farmers make cover sprays of organophosphates once a week
- Low infestations on the first crops in the spring
- Complete losses by summer with sequential cropping
- Ave 40% losses

Melon Fly Host Crops

A major pest of fruiting vegetables. Some major hosts are

Melon	Gourd
Squash	Tomato
Pumpkin	Cucumber

Research showed…

- Dr. T. Nishida found that melon fly had a defined behavior
  - Males & females “roost” on certain species of plants nearby or far away from crop hosts
  - We can take advantage of this by creating a system of trap plantings nearby crops
- McQuate showed that Sudex and Castor oil plant were good “roosting” hosts

Applied Biology and Ecology

- Melon fly female long maturation ca. 3 weeks
- Need protein source
  - We can kill many females and males before they attain sexual maturity using a system of trap plantings and attract & kill food baits
- Melon fly has a long lifespan
  - Reduce the lifespan of females using a system of trap plantings and attract & kill food baits

Melon fly suppression tactics implemented

1) **Crop hygiene**

Destruction of culled fruit within one week of last harvest

2) Attract & kill food baits – GF-120NF

- **Bait with spinosad**
- **Attracts <u>males & females</u> of tropical fruit fly species**
- **Adults need protein source**
- **Short-distance attractant**
- **Certified organic**
- **Dow AgroScience product**

GF-120

racts fruit flies by
ors

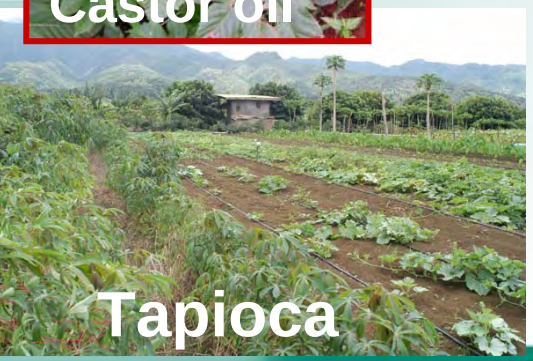
ked with water 1:4
1:10 v/v

es die after
ding on the bait
t not immediately)

ure and Human Resources

Bait Application

- **Used as spot or blotch spray**
- **Hand, backpack or mobile sprayers**
- **Use nozzle to have low volume output**
- **10-16 cm^2 spot is ok**



Trap plants

- Plant melon fly roosting hosts– corn, tapioca, sudex, or castor oil weed
- Roosting host should be **on-farm** where the food bait can be applied
- Spray once a week, more often during rainy periods

3) Attract & kill mass trapping (male annihilation)

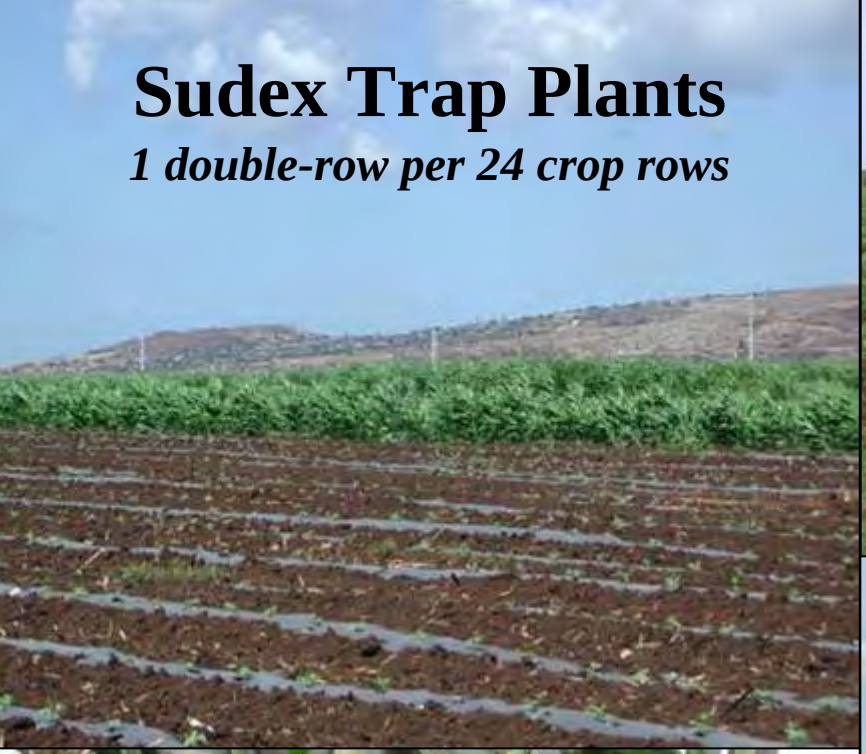
- Mass trapping of male flies using **cue lure** along with a killing agent
- Reduces mating
- 1 trap per 3 to 4 acres

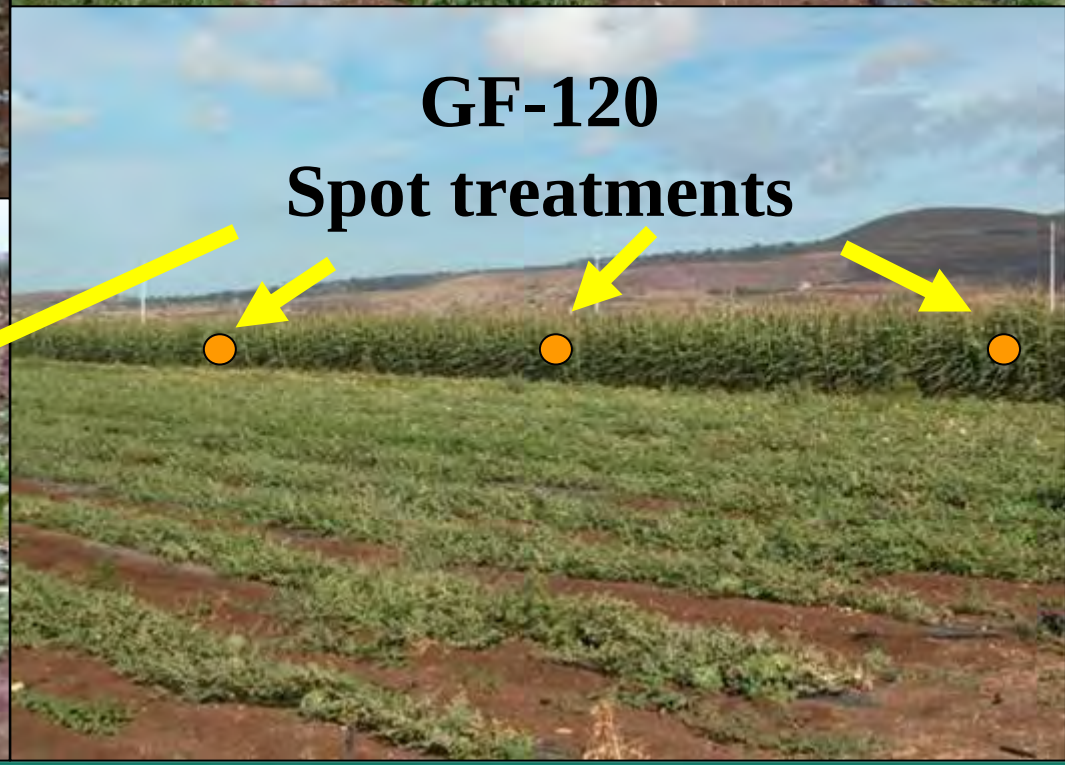
Hands-on Teaching Philosophy

- HAW-FLYPM gave GF-120, male lures and traps to cooperators who agreed to perform the control program.
- Education was on an area-wide basis.

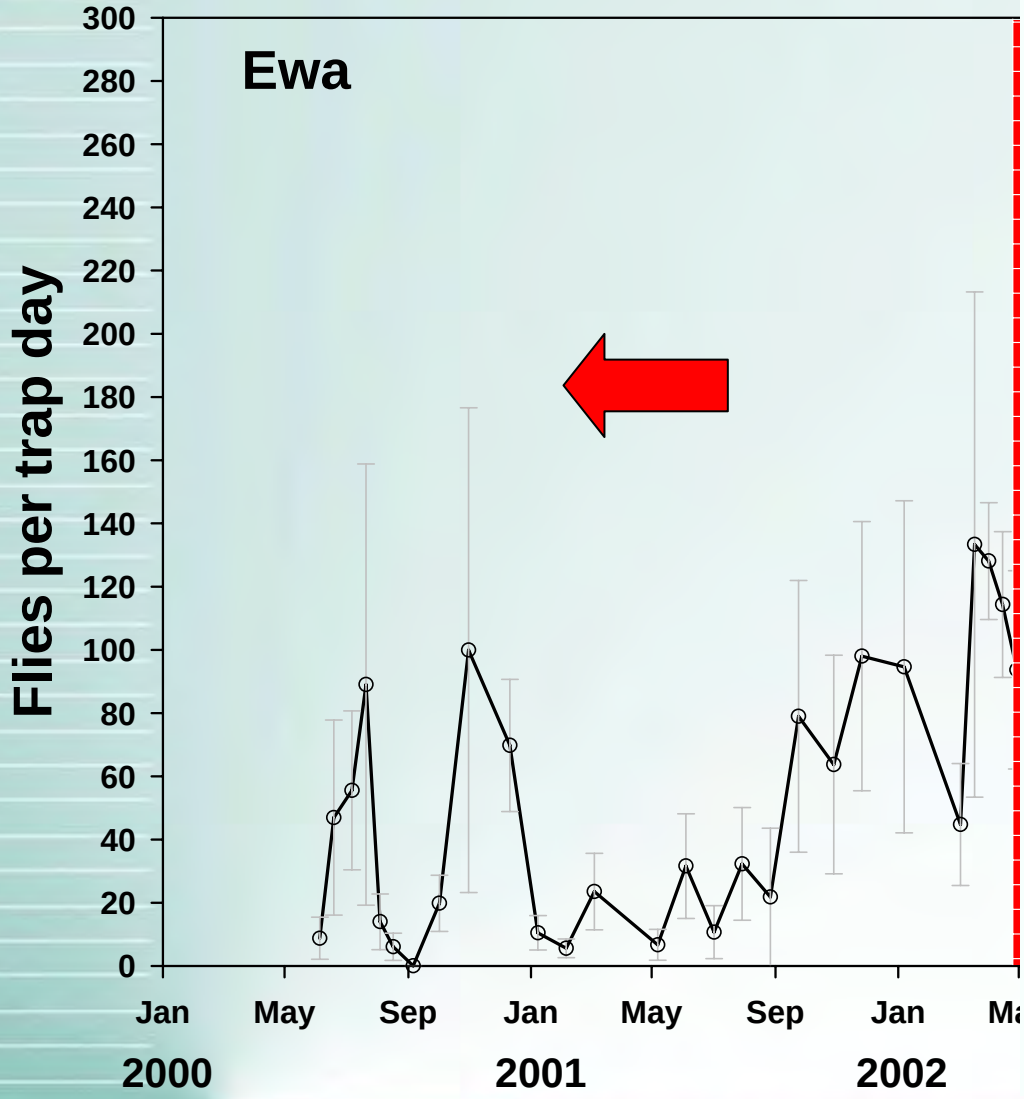
Sudex Trap Plants

1 double-row per 24 crop rows



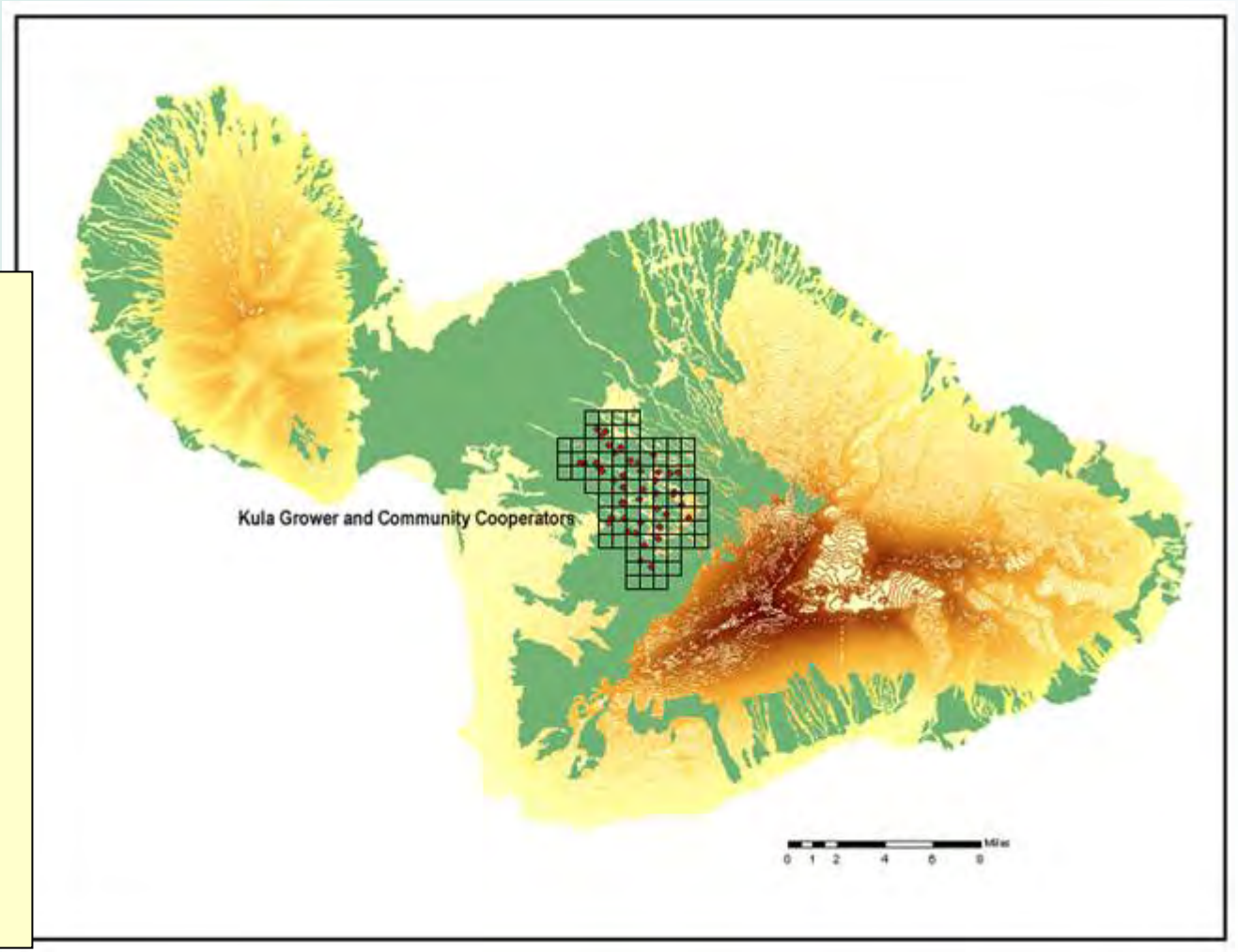


Oahu, Ewa: Melon Fruit Fly Population Monitoring



Maui Suppression Zone

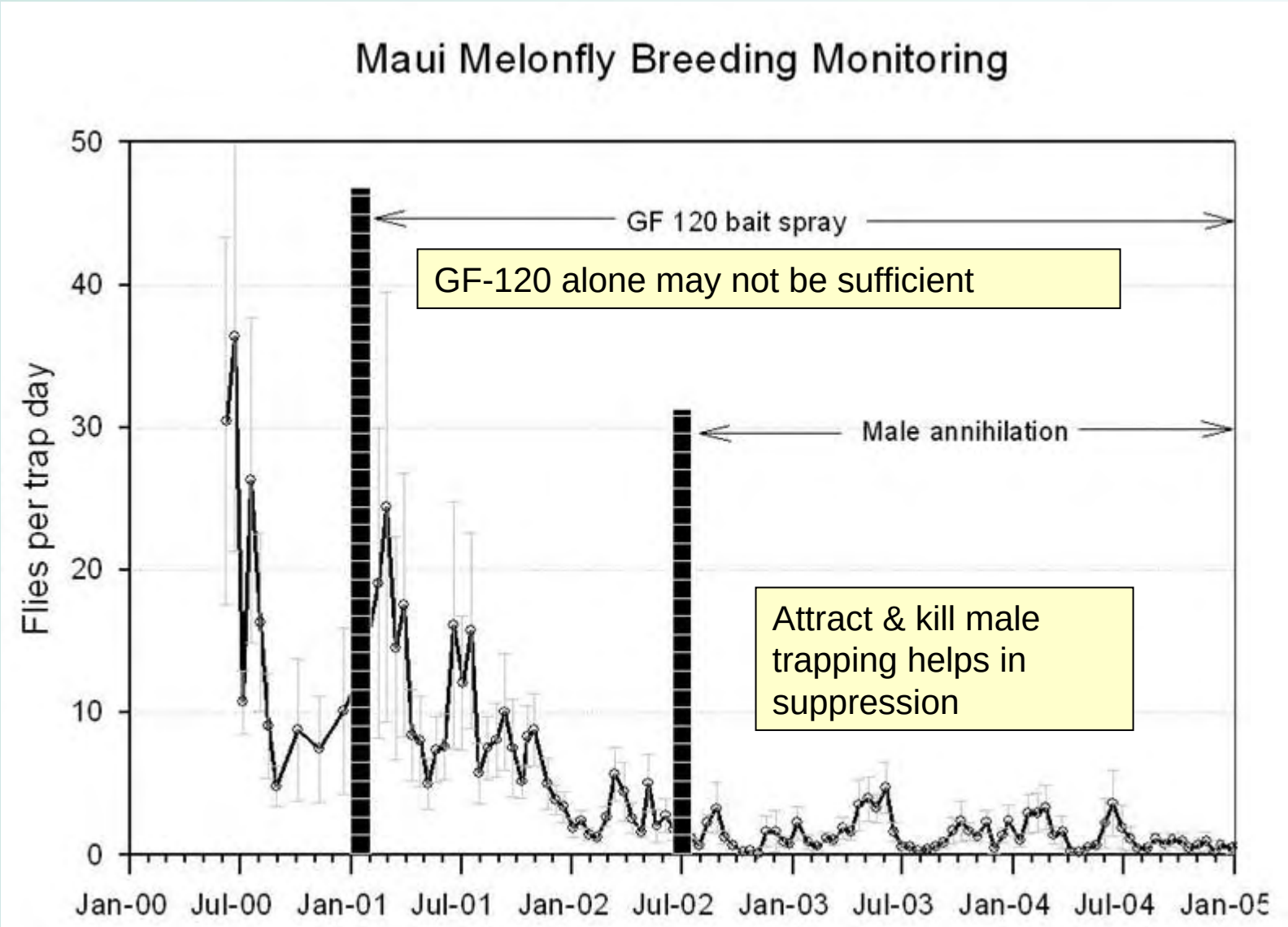
- **Implementation area - 10,900 acres**
- **Fruiting vegetables**
  - **Melons - summer**
  - **Squash - weekly**
  - **Tomato - weekly**
- **Tree fruits**
  - **Persimmon**
- **Fruit fly pests:**
  - **Melon fly is key pest**
  - **Med fly**
  - **Oriental fruit fly**



Castor oil plant

- Preferred trap plant
- Drought tolerant
- Perennial
- High association with melon flies in vicinity of susceptible crops

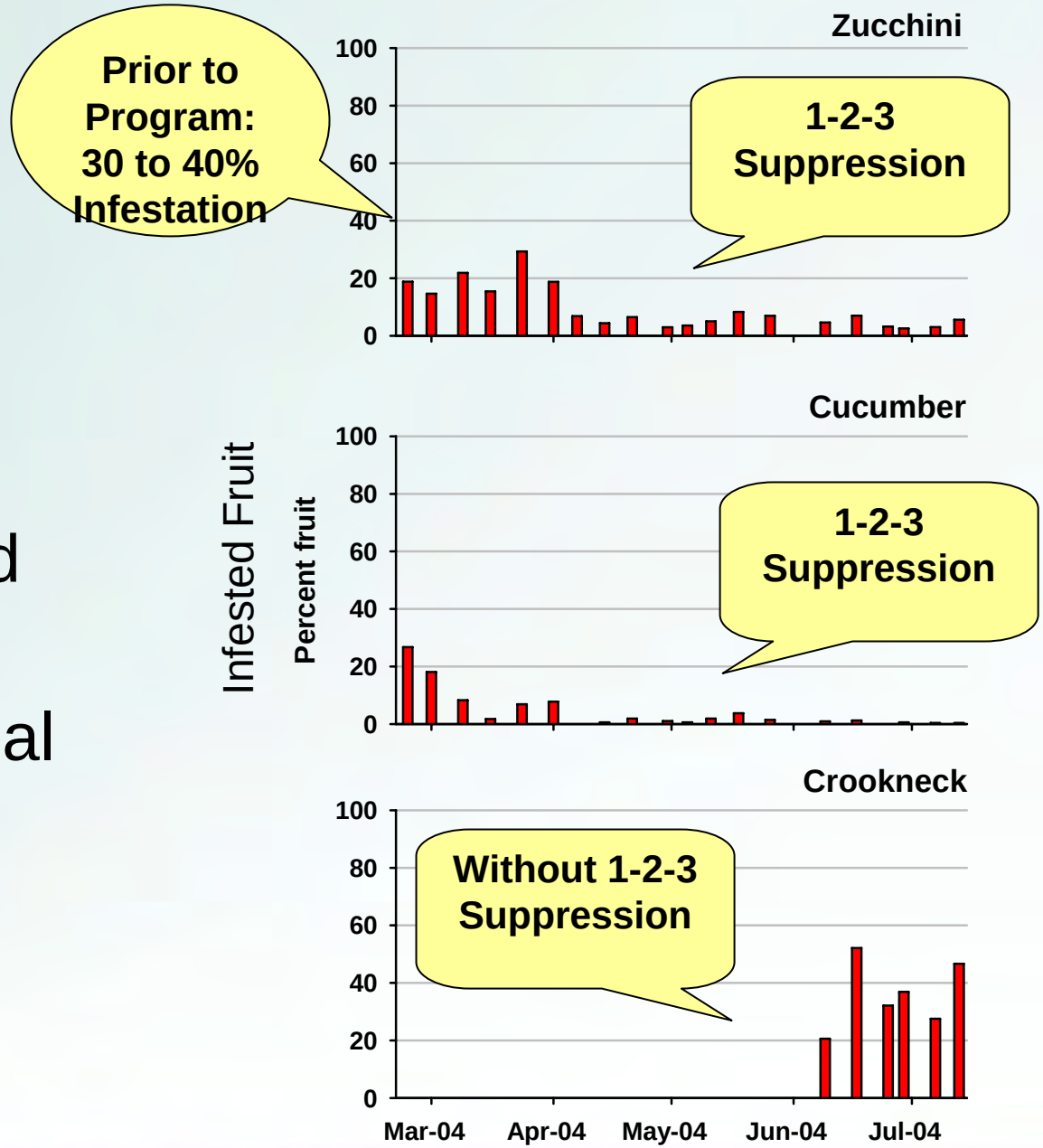
Female


Maui Melonfly Breeding Monitoring
Flies per trap day
50
40
30
20
10
0
GF 120 bait spray
GF-120 alone may not be sufficient
Male annihilation
Attract & kill male trapping helps in suppression
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05

Small Farm Infestations

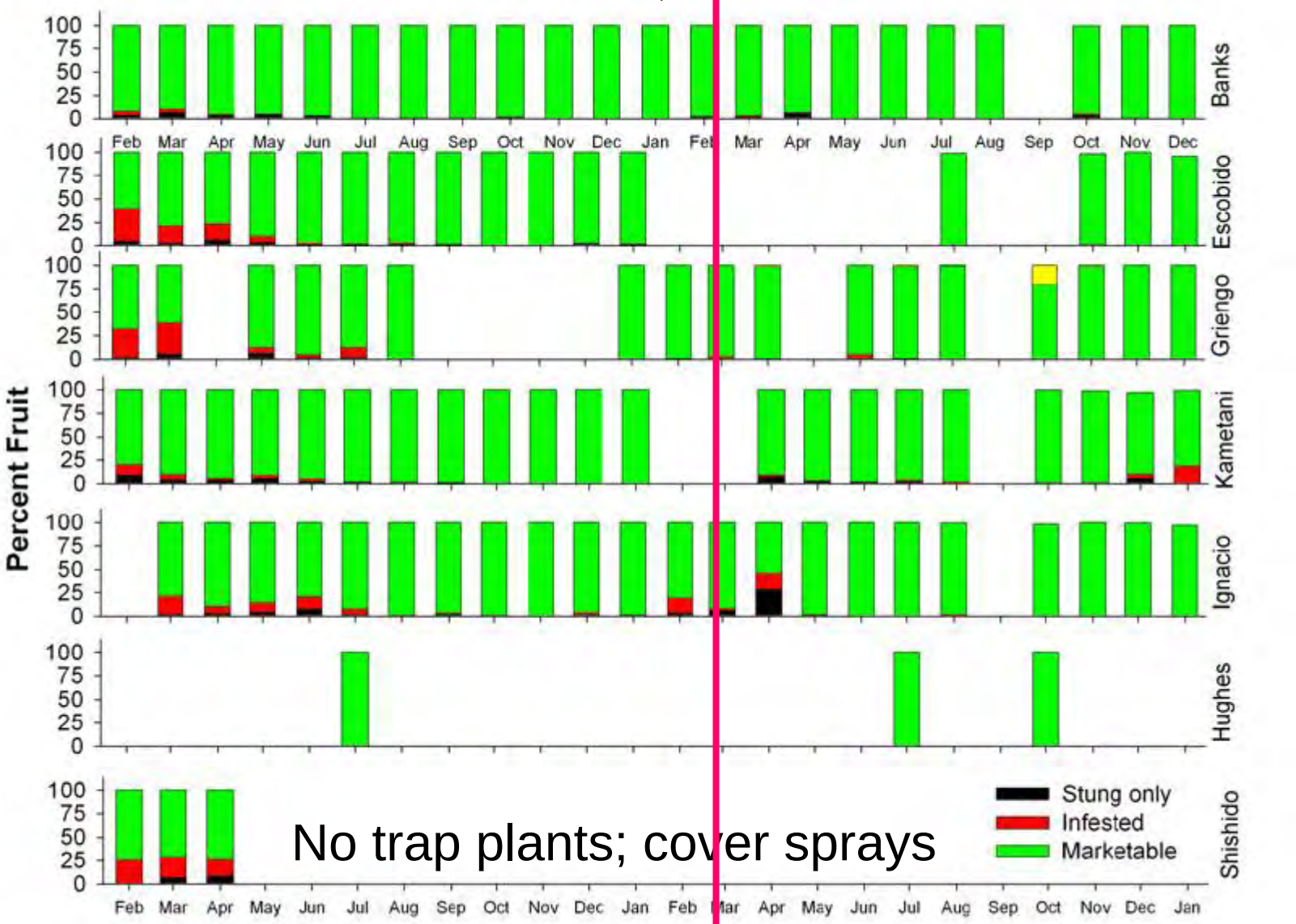
Kula, Maui 2004

- Multiple crops
- Small clustered farms
- Small sequential plantings



HAW-FLYPM Demonstration

Farmer decisions only



Economic Impacts

Melon Fly Suppression in Zucchini

- Twenty growers interviewed
- Universal view that they have significantly benefited from program adoption
- Benefits
  - Increase in marketable yield
  - Price increases resulting from improved quality
    - 80% grade A compared with 40% prior to adoption of 1-2-3
  - Reduction in labor costs with harvesting and grading
  - Savings associated with reduced insecticides use
- Financial benefits minus 1-2-3 costs
  - $6,359 per acre

McGregor, A.M. 2004. An economic evaluation of the Hawaiian fruit fly pest management program: An interim report.