Developing Sustainable Pest Control Practices Against Major Pests in Papaya

Leyla V Kaufman & Mark G Wright

Department of Plant and Environmental Protection Sciences, CTAHR, University of Hawaii

UNIVERSITY of HAWAI'I® MĀNOA

WESTERN SARE Sustainable Agriculture Research & Education

Objectives

- Develop management strategies that target multiple pests in papaya

- Seek treatments that have minimal environmental and non-target impacts

Pests targeted

- ***Thrips parvispinus*** - causes foliar and fruit injury as well as flower drop

- **Spider mites** – fruit scarring, leaf drop and loss of plant vigor.

- **Papaya mealybug** – chlorosis, leaf deformation, early fruit and leaf drop

- **White peach scale** – infests tree trunks and presence on fruit can lead to rejection of export shipments

Treatments

- Farmer's standard practice (Applaud, Vendex, Provado, Sulfur)
- Kaolin clay – Surround WP (50 lb/50 gal)
- Horticultural Oil – Pure Spray Green (1 %)
- Botanigard – *Beauveria bassiana*

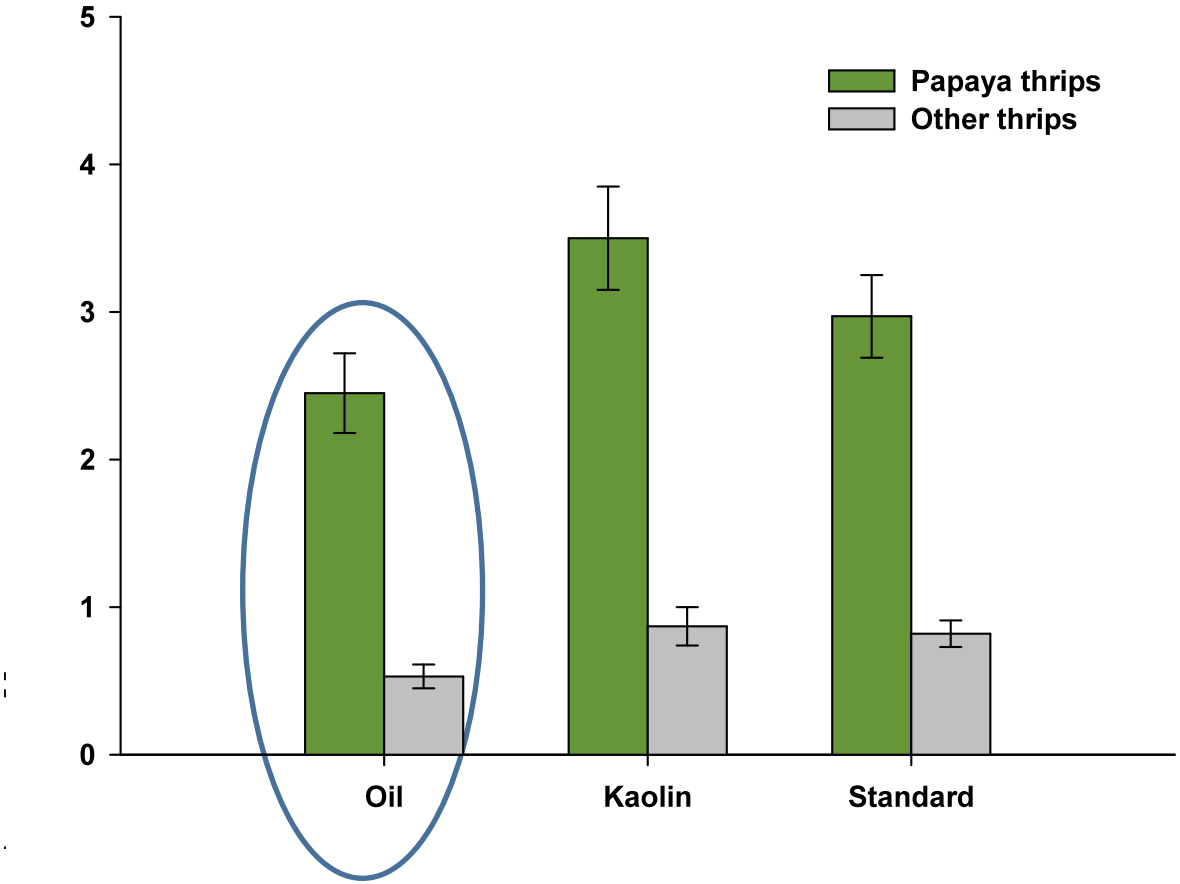
Data collection

- 2012 study : Big Island
- 2013 study : Big Island and Oahu
  - Pest monitoring done at monthly intervals for 7 months & weekly intervals at harvest period
  - Harvest period – 8 weeks

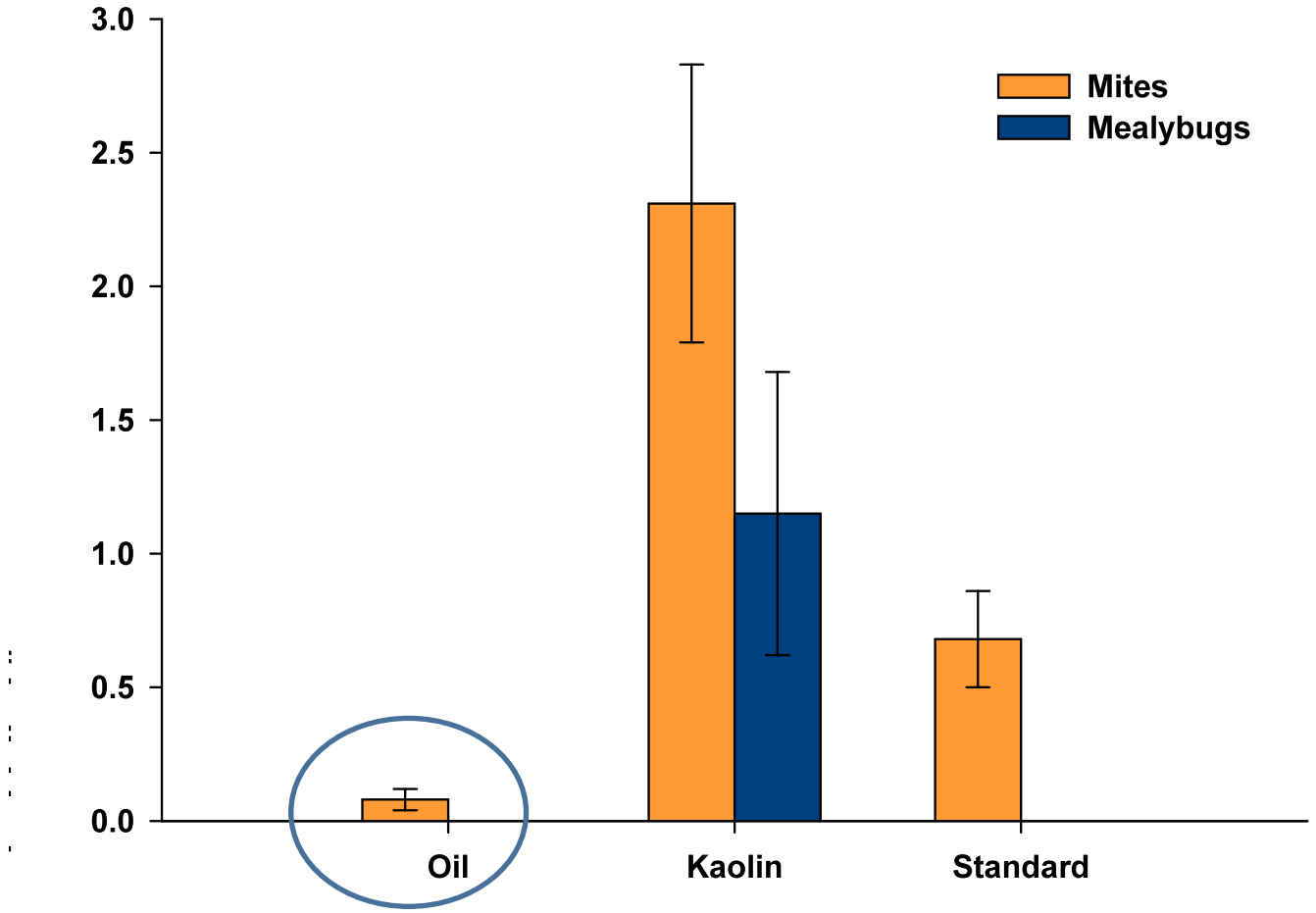
Sampling

- New leaves – Thrips & mites
- Flowers – Thrips & mites
- Old leaves – Mealybug & mites
- Tree trunk – White peach scale

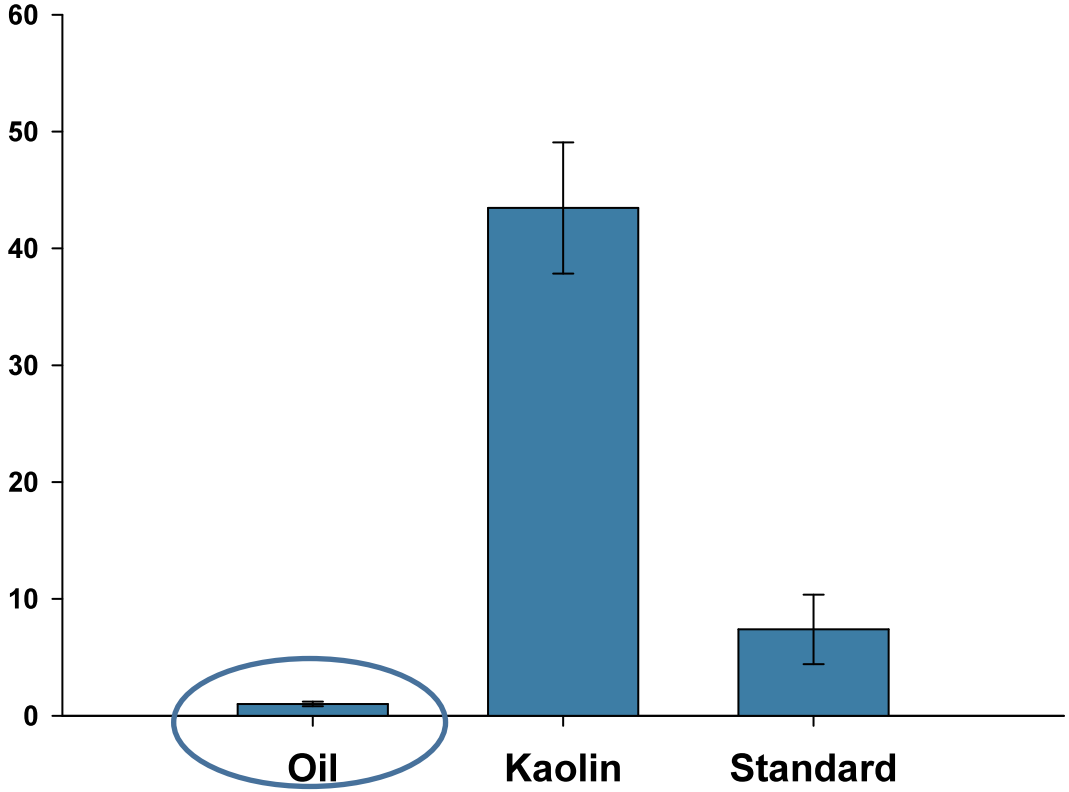
Pest density in flowers - 2012



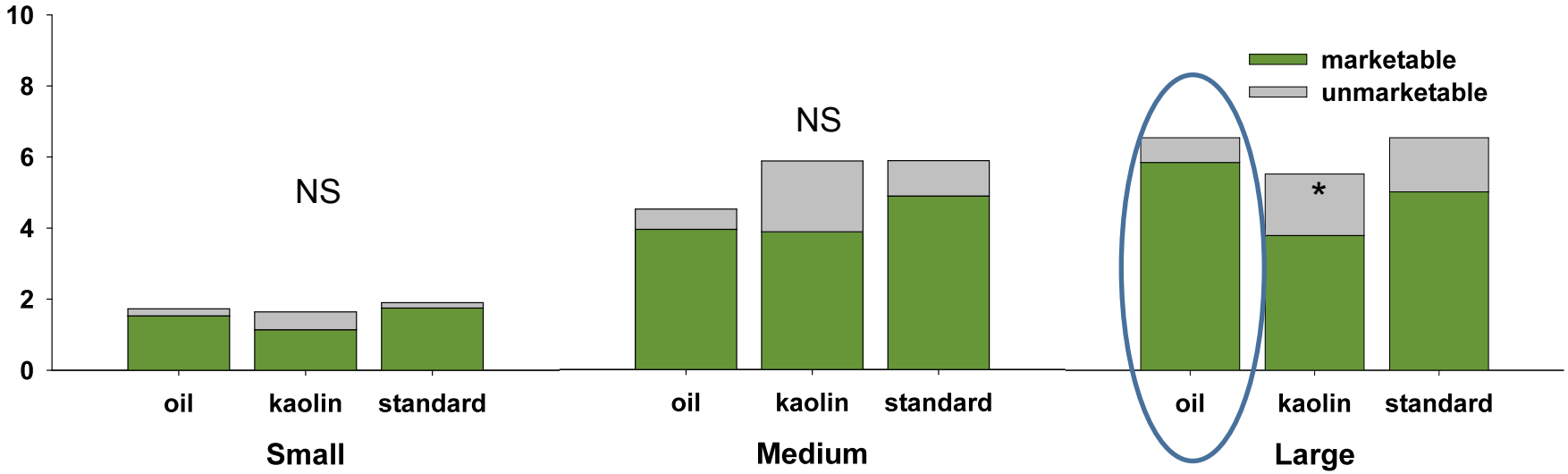
Pest density on old leaves - 2012



Pest density on tree trunks - 2012



Yield by fruit size -2012, mean mass per tree

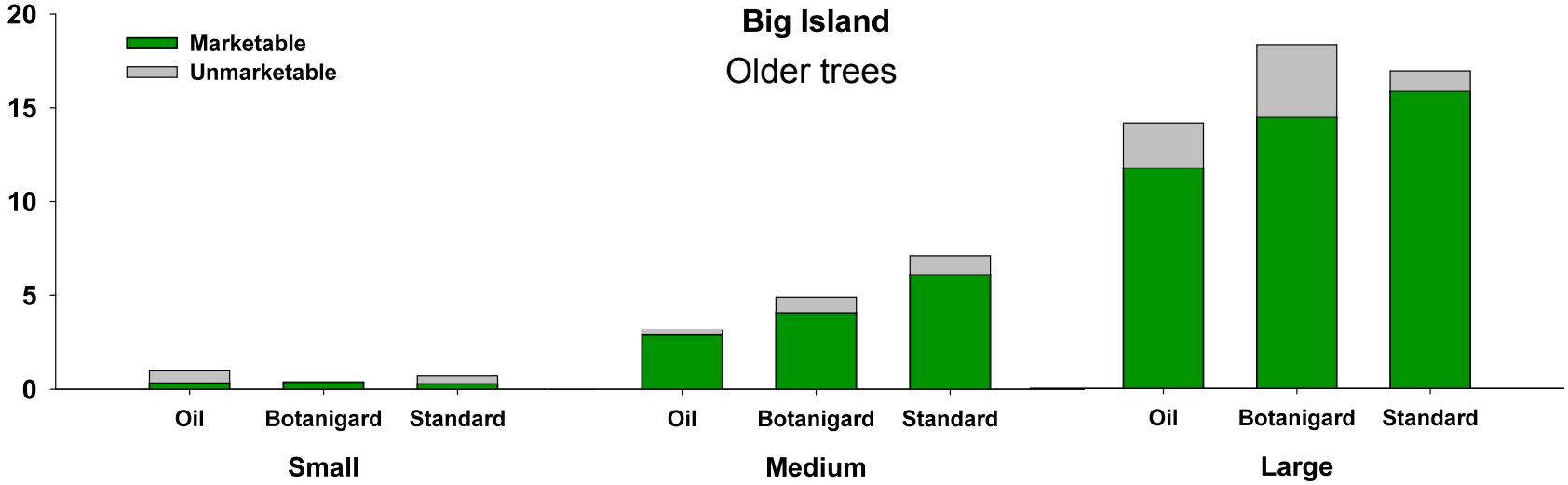


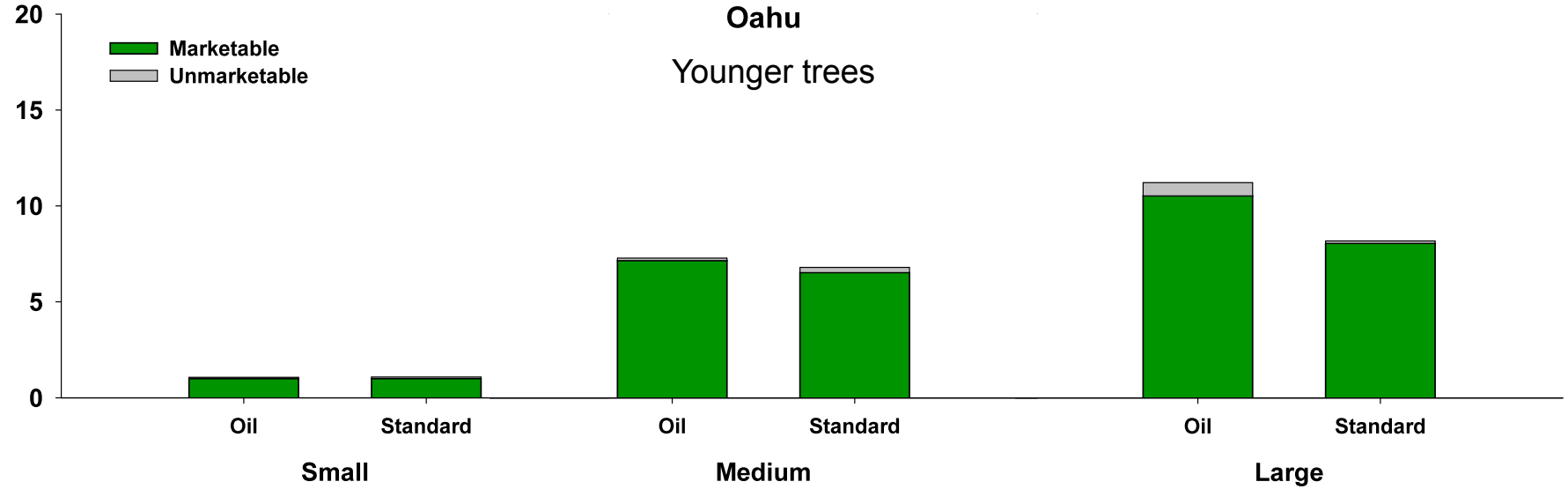
< 0.4 kg/fruit

0.4 – 0.59 kg/fruit

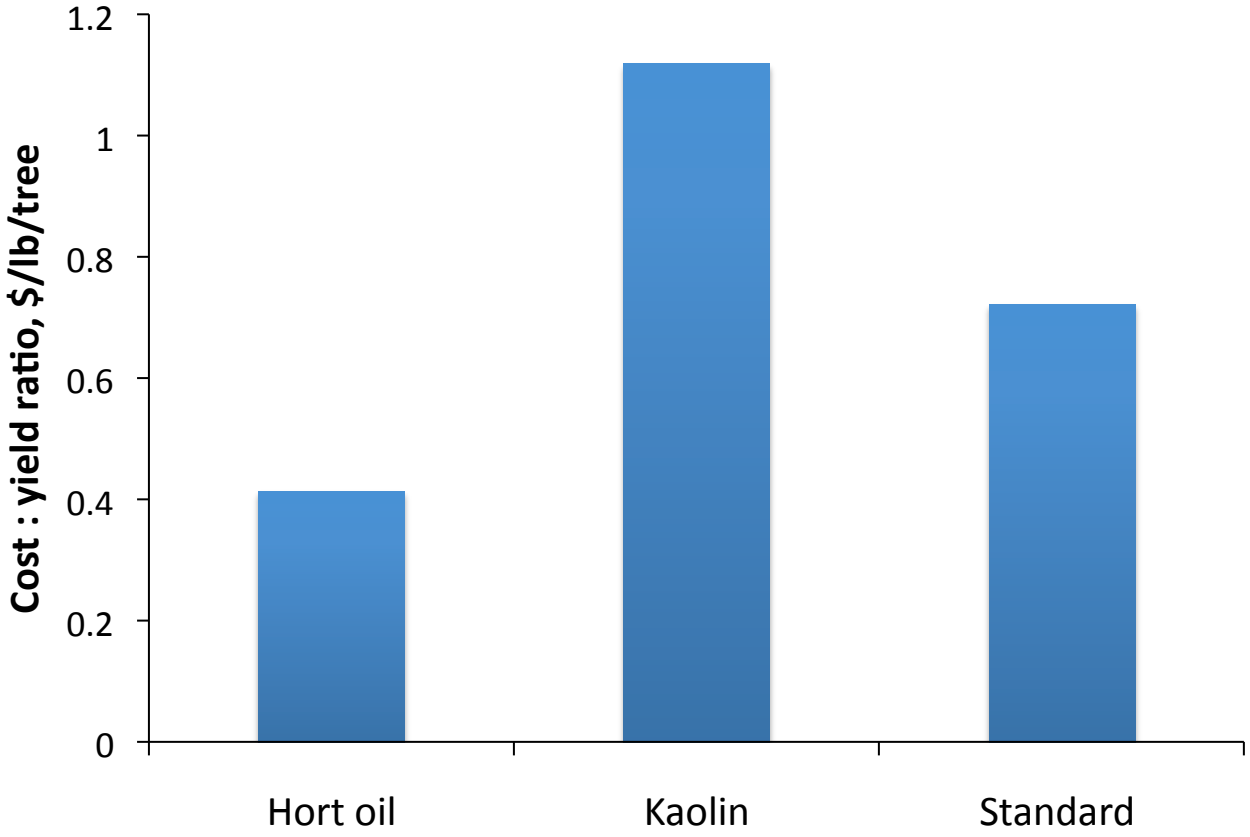
> 0.6 kg/fruit

Yield by fruit size – 2013, mean mass per tree





Treatment	Total cost, $	Mean yield, kg/tree	Mean yield, lb/tree	C:Y ($/lb) /tree
Hort oil	156	3.80	8.38	0.41
Kaolin	435	3.00	6.61	1.12
Standard	215	3.92	8.64	0.72



Conclusions

- Oil provided the best control against thrips, mites and white peach scale in 2012 study

- Mixed results in 2013. Big island oil treatment had the lowest yield (high scale infestation). Oahu oil treatment was superior than standard practice.

- Timing of preventive treatment – key to prevent pest build up. Plants in 2013 study on Big Island older than plants in 2012 study.

Conclusions

- Horticultural oil provided the best (lowest) cost to yield ratio in 2012 study.

- A regular IPM program may, however, include oil sprays and other pesticides, depending on pests present.

Acknowledgments

- Western SARE for funding
- Orlando & Justin Manuel and Ken Kamiya for letting us conduct the research
- Roshan Manandhar, Amber Tateno, Sam Moats-Messing & Katherine Nesheim for helping with data collection

Low-input integrated pest management of tomato viruses in Hawaii

Leyla Kaufman, Ted Radovich, Mike Melzer, Mark Wright, Jari Sugano

Department of Plant and Environmental Protection Sciences. CTAHR, University of Hawaii

Tomato viruses to manage

- TYLCV – vectored by silver leaf whitefly, *Bemisia argentifolii*

- TSWV – vectored by many species of thrips

Resistant variety study

- Dual resistant variety testing (beefstake, cherry, globe, grape, round)
  - Waimanalo organic plot : 10 varieties tested
  - Waialua: 15 varieties tested (ongoing study)

    Field Day for farmers in 3-4 weeks. Jari will contact farmers

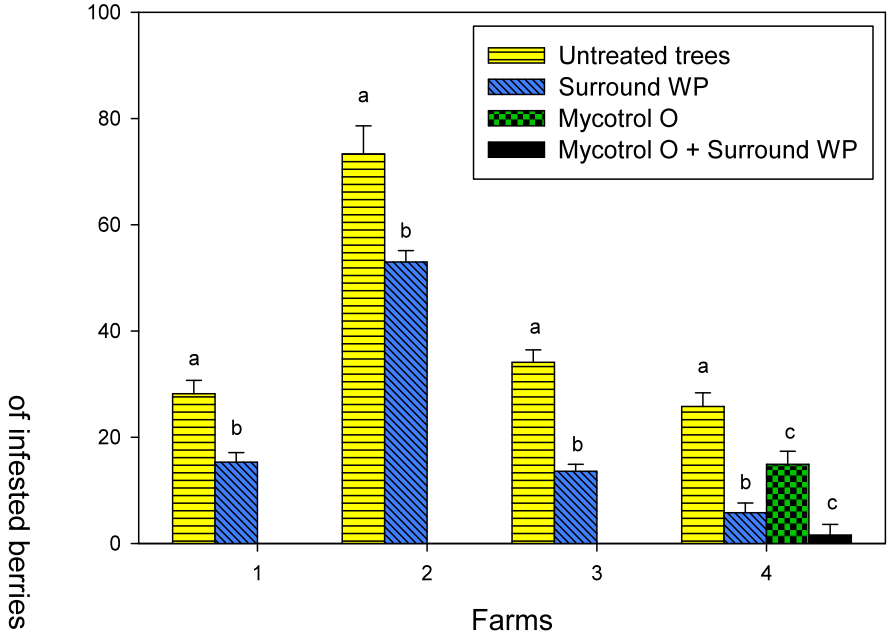
Next stage: IPM approaches to suppress insect vectors

- Evaluate the effectiveness of:
  - Kaolin clay
  - Horticultural oil
  - Reflective plastic mulch

Coffee Berry Borer (Elsie Greco)



- Examining effect of insect pathogenic fungi, repellants and kaolin barriers.

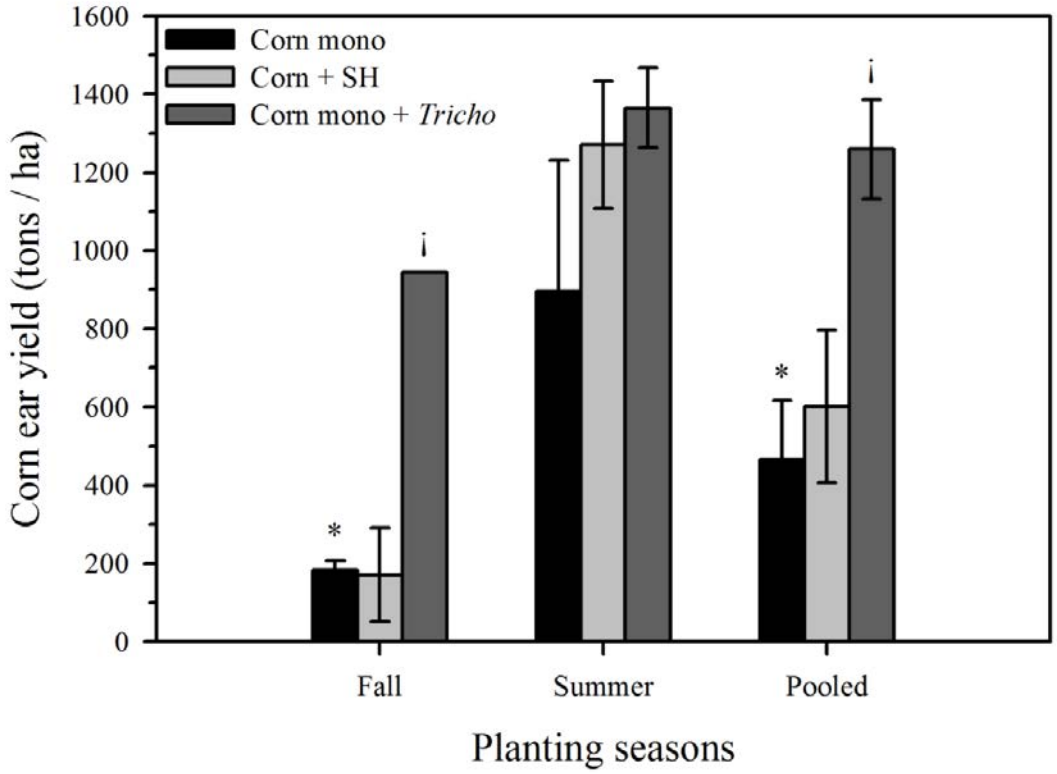


Corn earworm, sweetcorn (Roshan Manandhar)

- Major pest of Hawaii corn, difficult to control.
- Biocontrol? *Trichogramma* egg parasitoids; encouraged by inter-planting sunn hemp (alt host eggs);
- Compared to augmentative releases, corn monoculture

Corn earworm biocontrol

- Mass-releases of *Trichogramma pretiosum* provided best results - highest parasitism, highest yields;
- Sunn hemp increased parasitism slightly, but no significant increase in yield.



Contact: Mark G. Wright

markwrig@hawaii.edu

(808) 956-7670

Leyla Kaufman

leyla@hawaii.edu

(808) 956-2450