

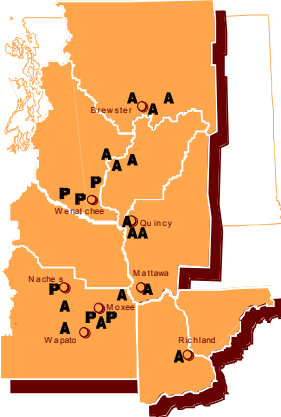
Can you survive without organophosphate insecticides?

After 3 years and at 15 locations the answer is yes!

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AWII Orchard Sites



Introduction

Can we survive without organophosphates (OP)?

WSU established 15 demonstration orchards throughout WA to examine this question. This program is referred to as Areawide II, after it's very successful predecessor, CAMP.

The main goal, evaluate codling moth mating disruption programs that replace supplemental OP controls with selective insecticides (e.g. oils, growth regulators, microbials, neo-neurotoxins)

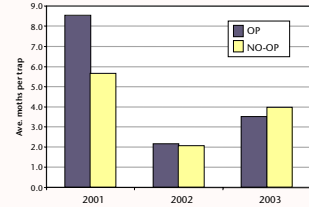
Each orchard was divided into side-by-side plots (at least 10 acres each)

- One side (OP) could choose any suitable insecticide to solve a problem
- The other (No-OP) had a restriction of using no OPs and went further to ask growers to choose the most selective alternative (i.e. Use Avaunt to control cutworms and not Thiodan)
- Both plots were treated with a reduced rate of hand-applied pheromone (200 disp/a) to supplement CM management

A critical factor to the success of any IPM program is information intensive decision making

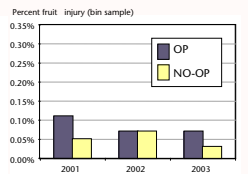
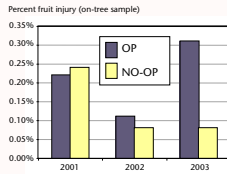
- Monitoring was conducted at each by highly trained consultants as well as WSU TFREC personnel
- Virtually all potential pests were monitored with standardized protocols and data was summarized and presented to growers, weekly.

Codling moth data



CM pressure was measured in each orchard with pheromone lures.

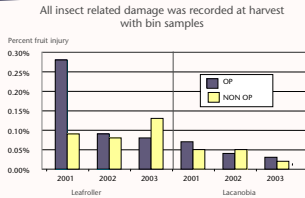
✓ On average, CM pressure was reduced in each treatment after the first year. There was very little difference between treatments



CM damage was measured in each orchard with an on-tree sample preharvest and a bin sample conducted during harvest

✓ CM damage was low across the AWII project. Very little difference was noted between treatments. The on-tree sample was biased towards border samples, which may account for a higher % damage being noted.

Secondary pests



✓ LR and Lacanobia damage were consistently low in each treatment, especially after 2001. Intrepid, Success and Esteem are excellent products for controlling these pests.

Campyloomma/Lygus- Damage was very low, 0.05% in OP treatment and 0.1% in No-OP, with majority of damage in one orchard (2003).

Mites- There was no evidence of mites infesting fruit at harvest. Only one OP orchard, and no No-OP orchards, had densities requiring a miticide treatment (2003).

Aphids/Predators- Densities were very low in all orchards, and consequently so were predator densities (2003).

Leafhopper- Densities were low in all orchards (2003).
Leafminer- Densities were low in all orchards (2003).

Potential pitfalls

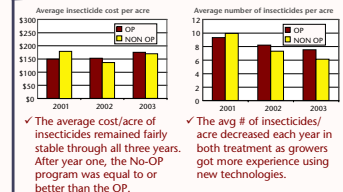
Removal of OPs presents some potential problems if implementation is expected by all growers

- Removal of Lorsban from delayed-dormant spray
- Suppresses LR so that soft alternatives will work better
- Suppresses Campyloomma, often below treatment thresholds
- Woolly apple aphids- Thiodan available, not as effective as Diazinon
- Lygus, stink bugs- Although OPs not critical, no soft alternatives
- Thrips- OP not necessary, but no soft alternative either

Growers may still be reliant on Thiodan, Carzol and possibly synthetic pyrethroids unless selective insecticides are developed for specific pests

Pest	Traditional (includes OPs)	Most selective alternative (No-OP)
Codling moth	Pheromone, Guthion, Imidan, Assail, Sevin	Pheromone, Intrepid, Esteem, Virus, Assail
Leafroller	Lorsban, Success	Bi, Esteem, Intrepid
Cutworms	Lorsban, Thiodan	Avaunt, Intrepid
Mites	Oil, AgrimMek, Pyramite	Oil, Savey, Apollo
Aphids	Lorsban, Dimethoate,	Provado (RAA), soap, oil
Wolly Apple Aphid	Diazinon	Thiodan
Campylomma, Lygus, Stink bugs	Lorsban, Dimethoate, Carzol, Thiodan, Danitol	Carzol, Thiodan
Scale	Oil, Lorsban	Oil, Esteem
Leafminer	Vydate, Success, Provado	Success
Thrips	Carzol	Carzol
Leafhopper	Sevin, Provado	Oil, Avaunt

Insecticide use and cost



Insecticide	Avg. applications/acre		Total by class	Total Applications/acre	
	OP	NO-OP		OP	NO-OP
Guthion	0.0	0.6	Chrysothothrips	0.0	1.4
Lorsban	0.0	0.5			
Diazinon	0.0	0.1	Growth regulators	2.0	0.4
Dimethoate	0.0	0.1			
Imidan	0.2	0.6	Miticides	0.0	0.2
Avant	0.1	0.1			
Provado	0.1	0.1			
Assail	0.1	0.1			
Intrepid	0.3	0.3			
Esteem	0.7	0.1			
Neodan	0.0	0.1			
Biobit	0.0	0.1			
Bi	0.0	0.1			
Protonox	0.5	0.5			
Sevin	0.6	0.7			
Carzol	0.2	0.2			
Oil	1.3	1.6			

OP spray programs were driven by Lorsban for leafrollers, and Guthion with supplemental Assail treatments for CM. The No-OP program was characterized by the use of growth regulators for both CM and LR, and Assail supplements for CM.

Conclusions

- ✓ Non-OP treatments were able to maintain CM injury equal to OP treatments, even with increased pressure
- ✓ No real change in CM injury was noted in either treatment after three years

- ✓ No pest flare-ups were encountered after three years that couldn't be managed with Non-OP alternatives
- ✓ Potential problems with a Non-OP program are true bugs (Campylomma, Lygus, stink bugs) and woolly apple aphids,
- ✓ A complete reliance on "soft" chemicals may be limited without new alternatives for thrips and rosy apple aphids

- ✓ The average number and cost of insecticide applications and were similar between the two treatments
- ✓ The Non-OP program relied on growth regulators for CM and LR control with supplemental Assail treatments for CM, while the OP program relied on Guthion and Assail for CM and Success for LR
- ✓ A Non-OP, pheromone-based management program can be competitive with a conventional OP program in cost and efficacy