

Investigating Pesticide Performance and Spray Coverage in Tart Cherry



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- Regulators are removing/reducing contact insecticides
- With limited insecticides, growers still must control pests
- New chemistries with novel modes of action
 - Anti-ovipositional, anti-feedant, and/or ingestion
 - Capable of acting on one/multiple life stages
 - Control pests differently than traditional insecticides

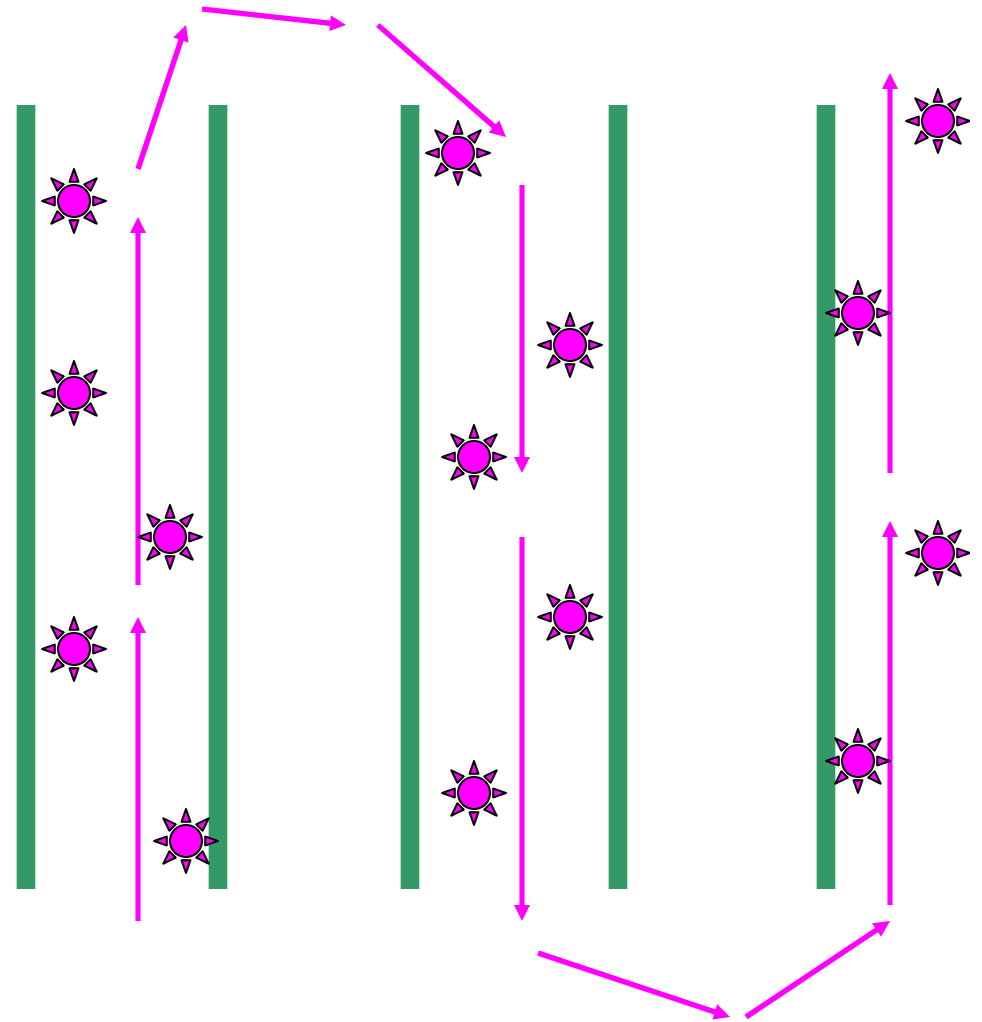
Rationale

- We need to investigate new insecticides' efficacies under standard spray regimes in tart cherry systems



Current MI Pest Mgmt. Strategy

- Growers spray alternate row middles
 - Successful with traditional pesticides
 - Saves time, fuel, and \$
- Antidotal evidence suggests strategy will not work with new insecticides
- Every row spraying will increase costs
 - Materials, time, fuel
 - Dramatically changes growers' bottom line
 - Ultimately, must maintain zero-tolerance standard

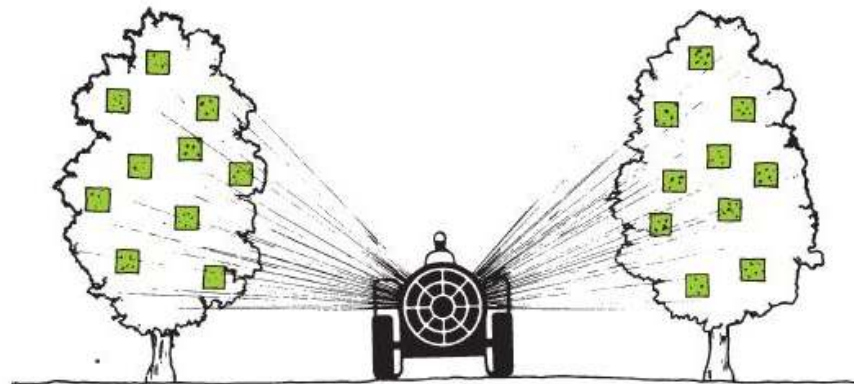


Methods

- Determine efficacy of insecticides based on spray coverage
 - Two insecticides: Indoxacarb (ingestion-active) and phosmet (contact)
 - Two sprayers: Curtec and airblast



Curtec



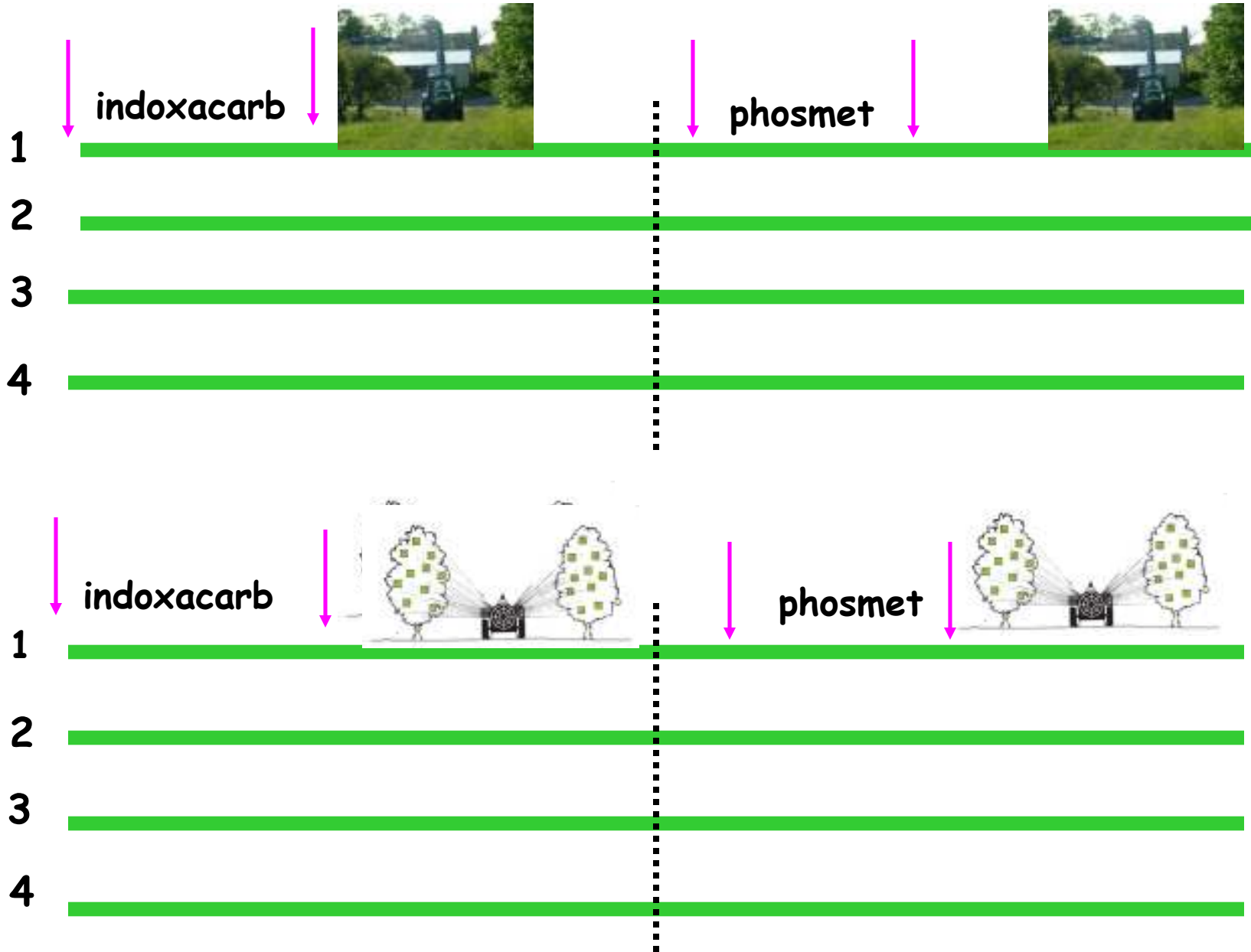
airblast

Methods, cont.

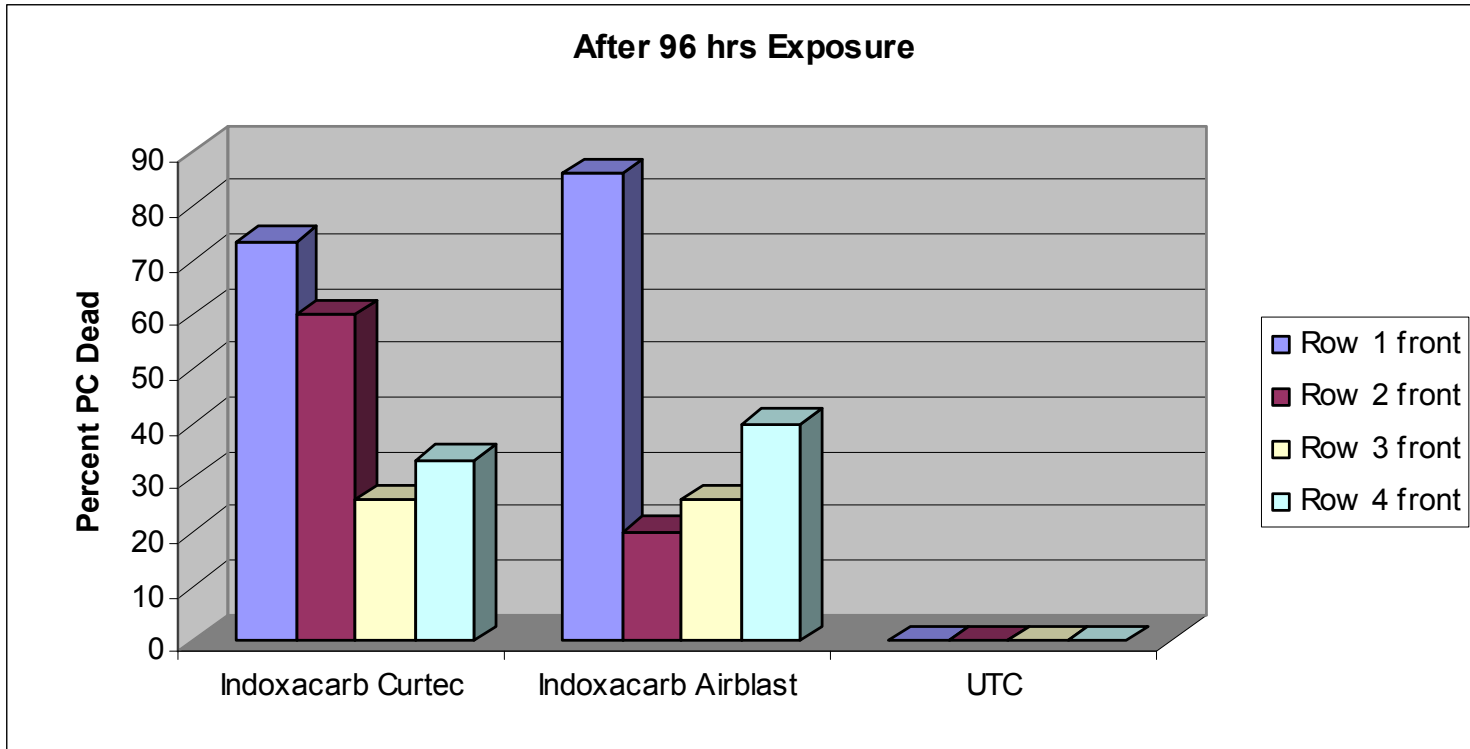
- Collected 10 fruit clusters from *both sides* of tree
 - Rows 1-4
- 5 fruit clusters analyzed with HPLC to determine insecticide residue
- Bioassays
 - Field-collected plum curculio adults (*Conotrachelus nenuphar*)
 - Exposed to field-treated residues in chambers
 - Determined % mortality and fruit damage



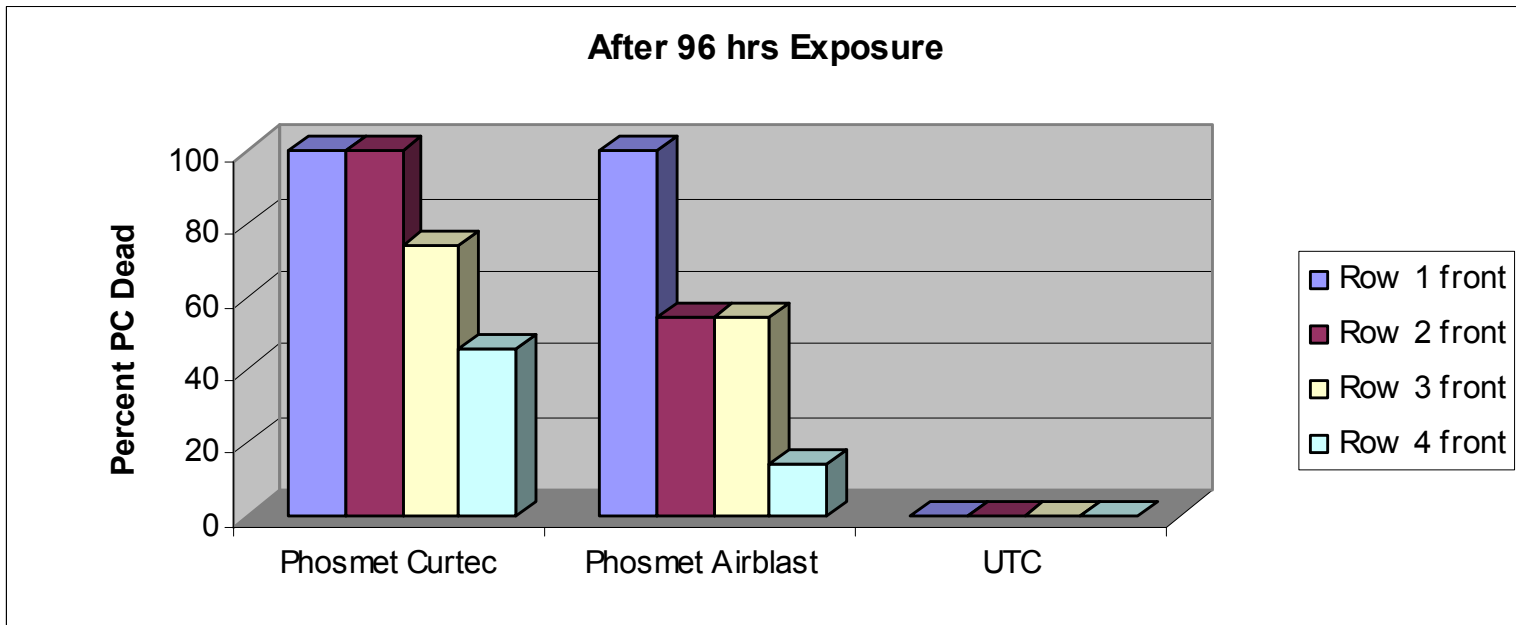
Results



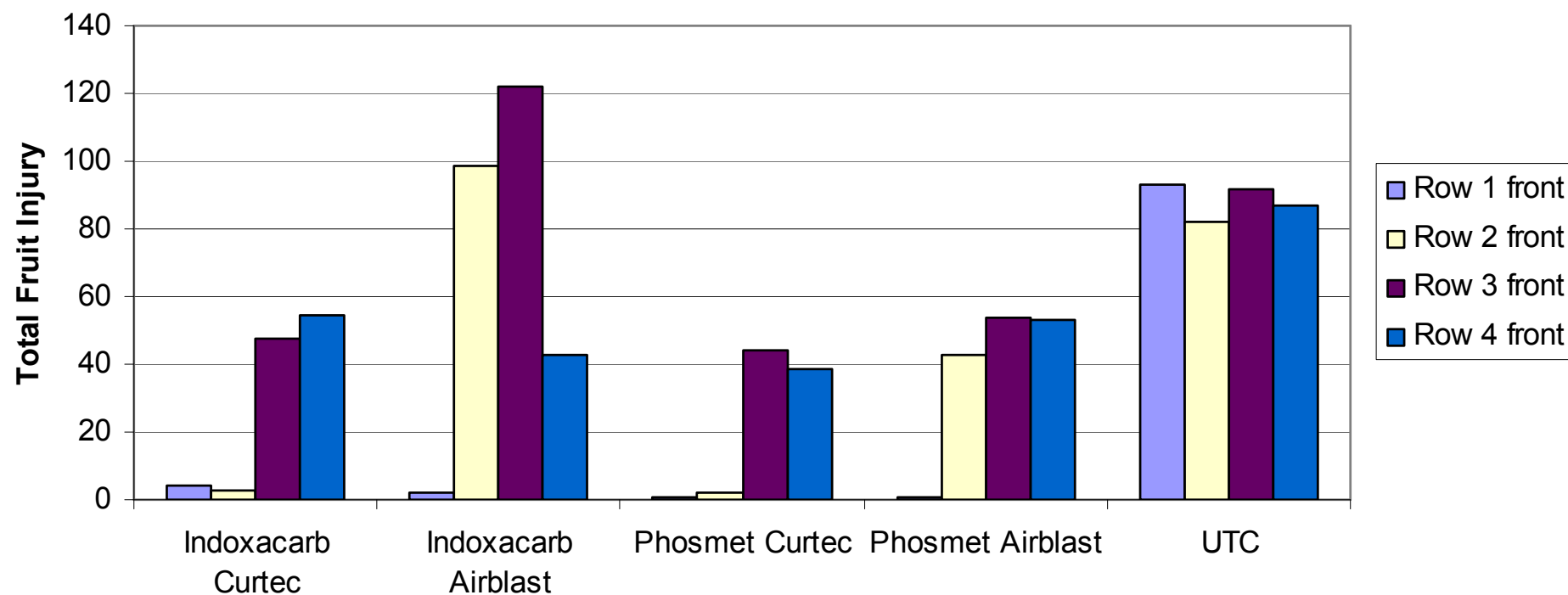
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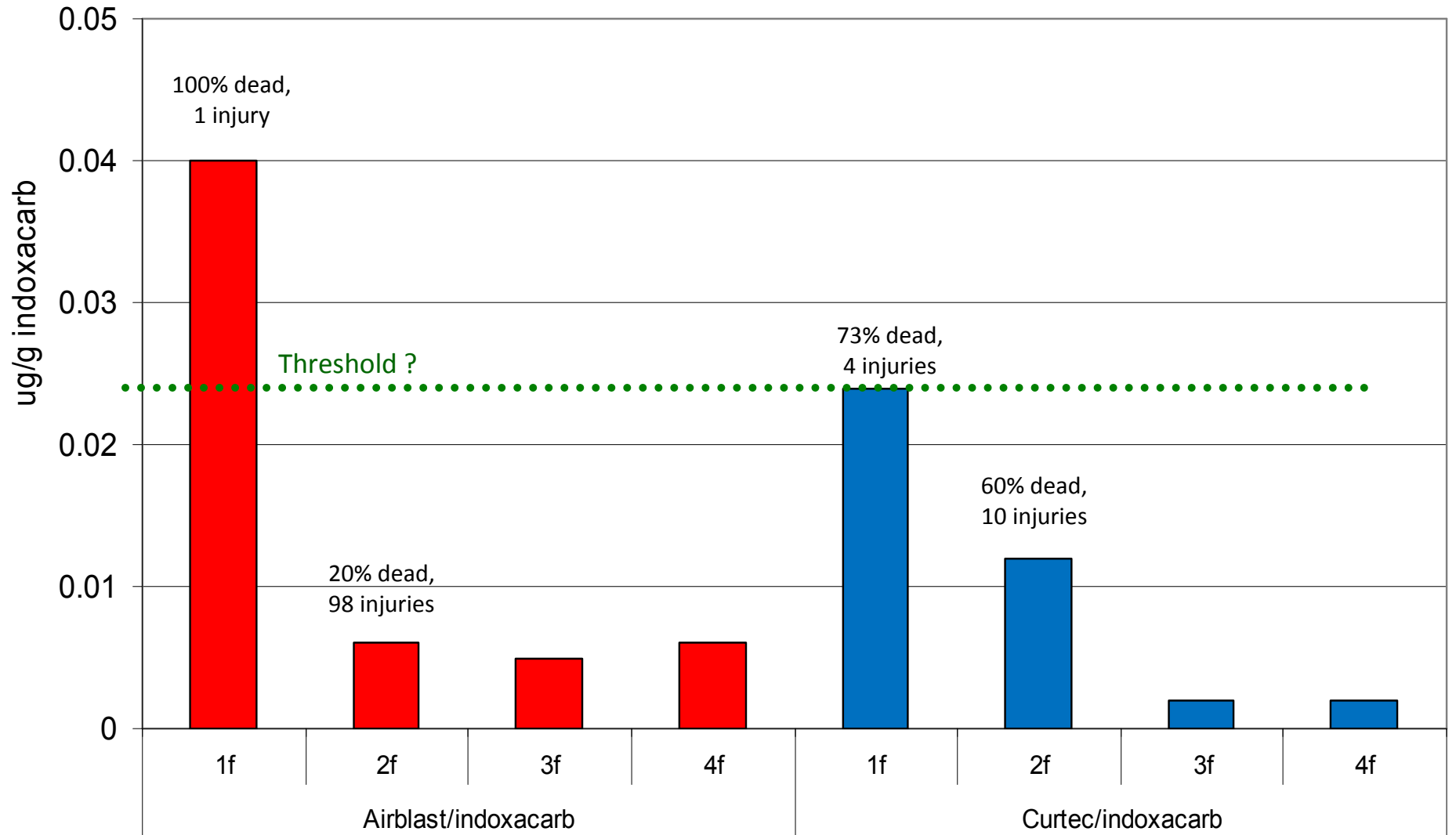


Total Fruit Injury

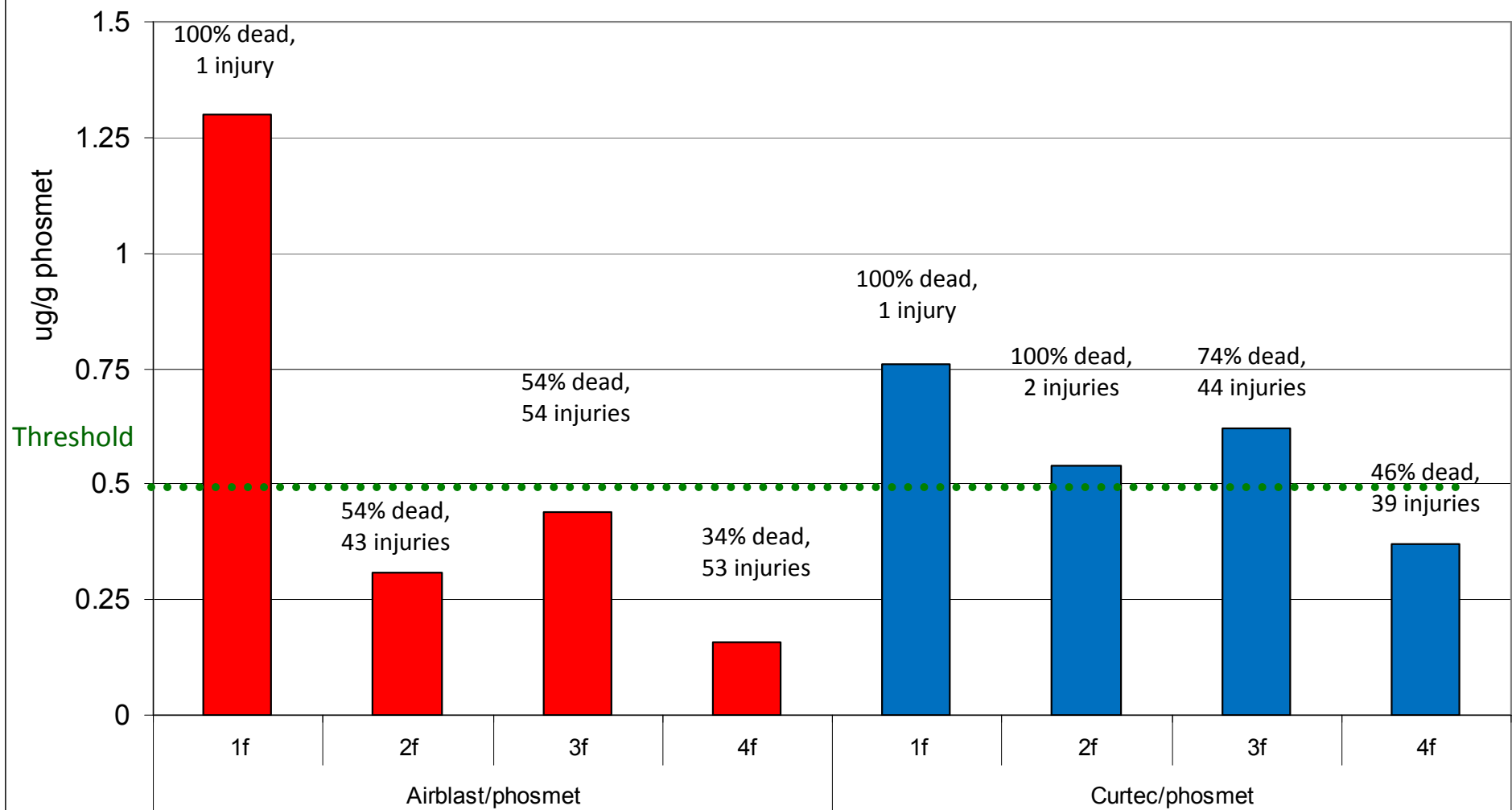


Fruit injury = feeding + ovipositional stings

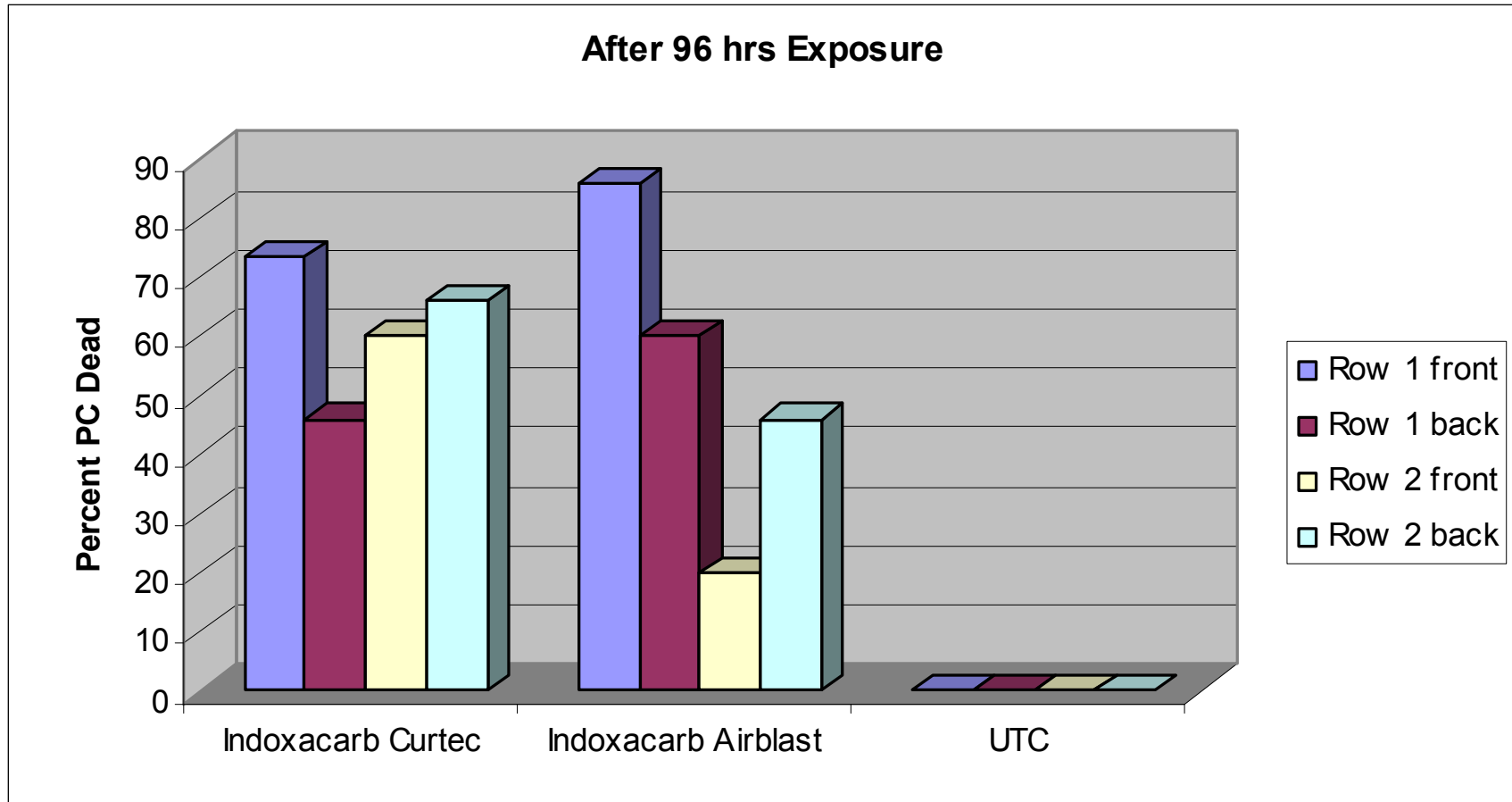
Indoxacarb Residue Profiles Across Front Rows



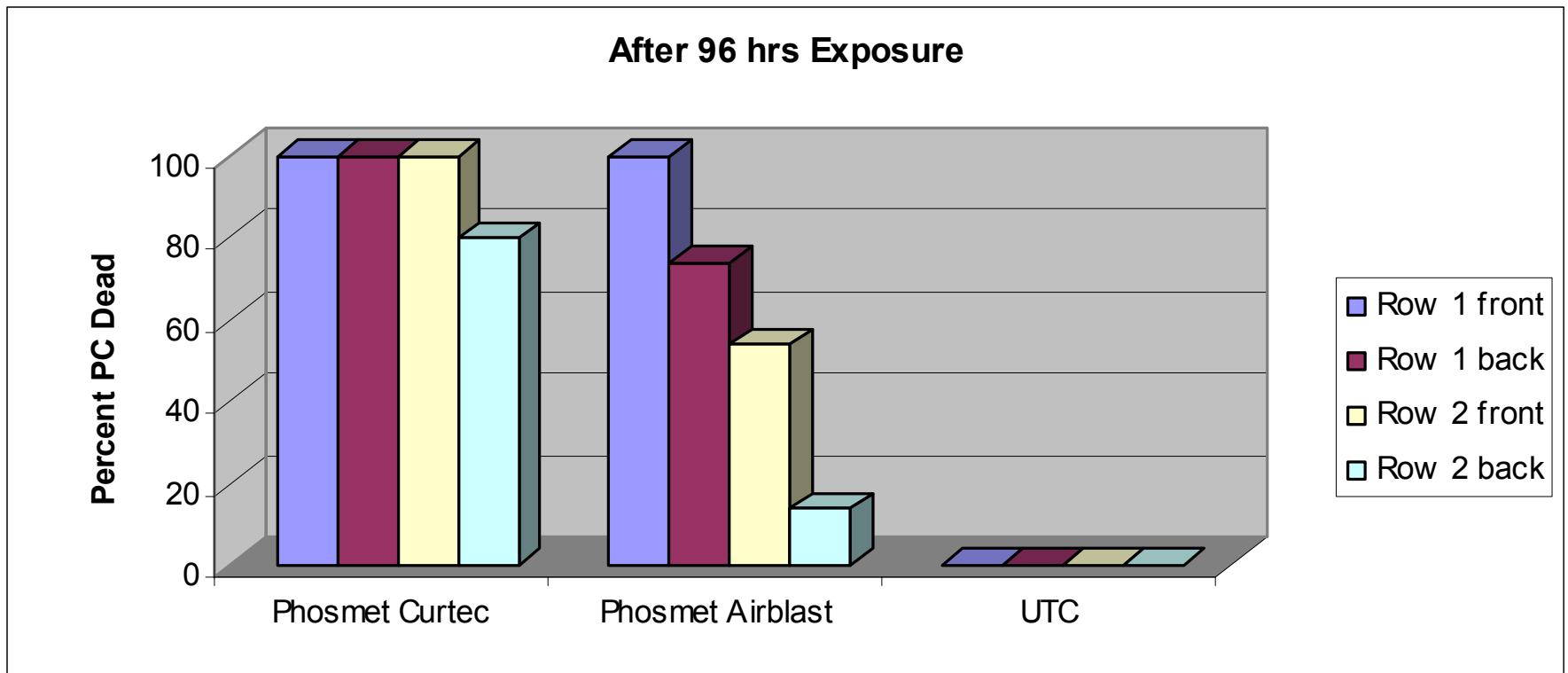
Phosmet Residue Profiles Across Front Rows



Alt. Row Strategy, Indoxacarb



Alt. Row Strategy, Phosmet



Conclusions: Airblast Sprayers

- Excess residue deposition on row 1---
drops off dramatically at row 2
 - Applying too much insecticide to **1st row**
 - Phosmet: Applies $2 \frac{1}{2}$ x amount of necessary insecticide to provide control
 - Indoxacarb: Applies $1 \frac{3}{4}$ x amount of necessary insecticide to provide control
 - **Inadequate** coverage beyond row 1

Conclusions: Curtec Sprayers

- Deposit residues more evenly to *all* rows
 - Detection does not = efficacy
- Insecticide mode of action + Curtec technology impact efficacy
 - Residue level/spray coverage for ingestion insecticides must be higher than contact nerve poisons
 - Deposition patter of Curtec maximizes performance of contact insecticides

Insecticide	Row 1	Row 2	Row 3	Row 4
Indoxacarb	73	60	26	33
Phosmet	100	100	74	46

Conclusions

- As reduced risk insecticides become the standard, alternate row spray strategy may not provide adequate control
- Future Trials:
 - Repeat trial with fungicides
 - Demonstration trials that mimic 'real' alternate row middle spraying for both insecticides and fungicides

Thank You!

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Myron Anderson,
- Chris Vandervoort
- TNRC staff

