Managing Phytophthora Disease with Fungicides

M.K. Hausbeck, A.P. Keinath, C.S. Kousik, and M.E. Matheron

Phytophthora capsici Host Range

Cucurbitaceae

Solanaceae

Fabaceae

Crops at Risk

Cantaloupe	Summer squash	Eggplant
Cucumber	Watermelon	Tomato
Gourd	Winter squash	Lima bean
Honeydew melon	Zucchini	Snap bean
Muskmelon	Bell pepper	Wax bean
Pumpkin	Hot pepper	

One size does not fit all!

Several approaches are needed.

Phytophthora-infested site:

Crop rotation	+	Soil fumiga-tion	+	Raised 8" bed, black plastic, trickle, subsoil	+	Plant resistance	+

Irrigate sparingly from well	+	Fungicide sprays intensive	+	Destroy diseased plants	+	Harvest early

Growing Strategies

- **Raised beds, black plastic, and drip irrigation are a key strategy.**

- **Water management through improved drainage and sub-soiling.**

- **Avoid planting in the low areas of fields.**

Flat vs Raised

Raised/plastic/compost vs Raised

Each growing system offers unique challenges:

■ **Short vs. long production time.**

Each growing system offers unique challenges:

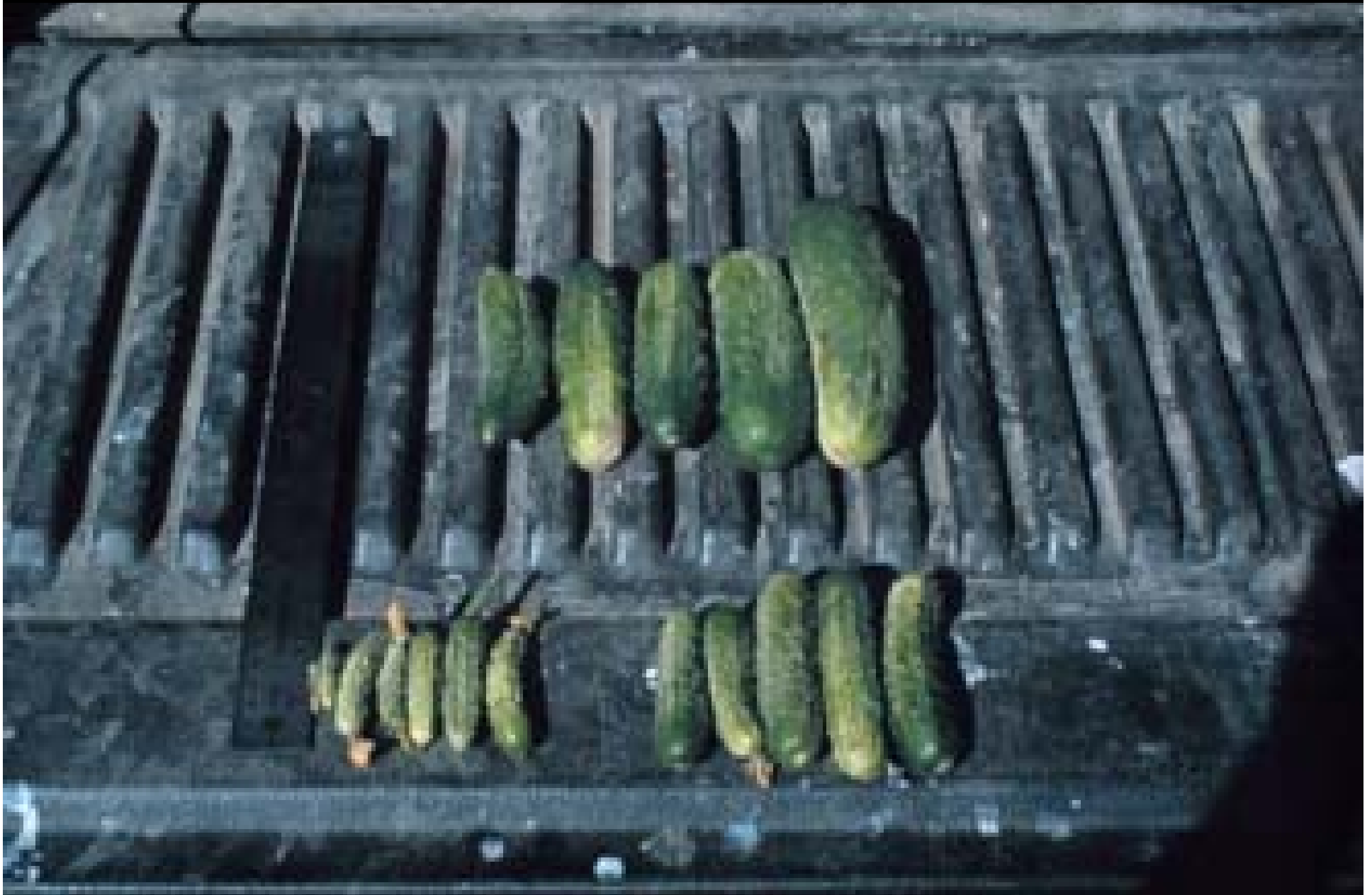- **Hand vs. mechanical harvest.**

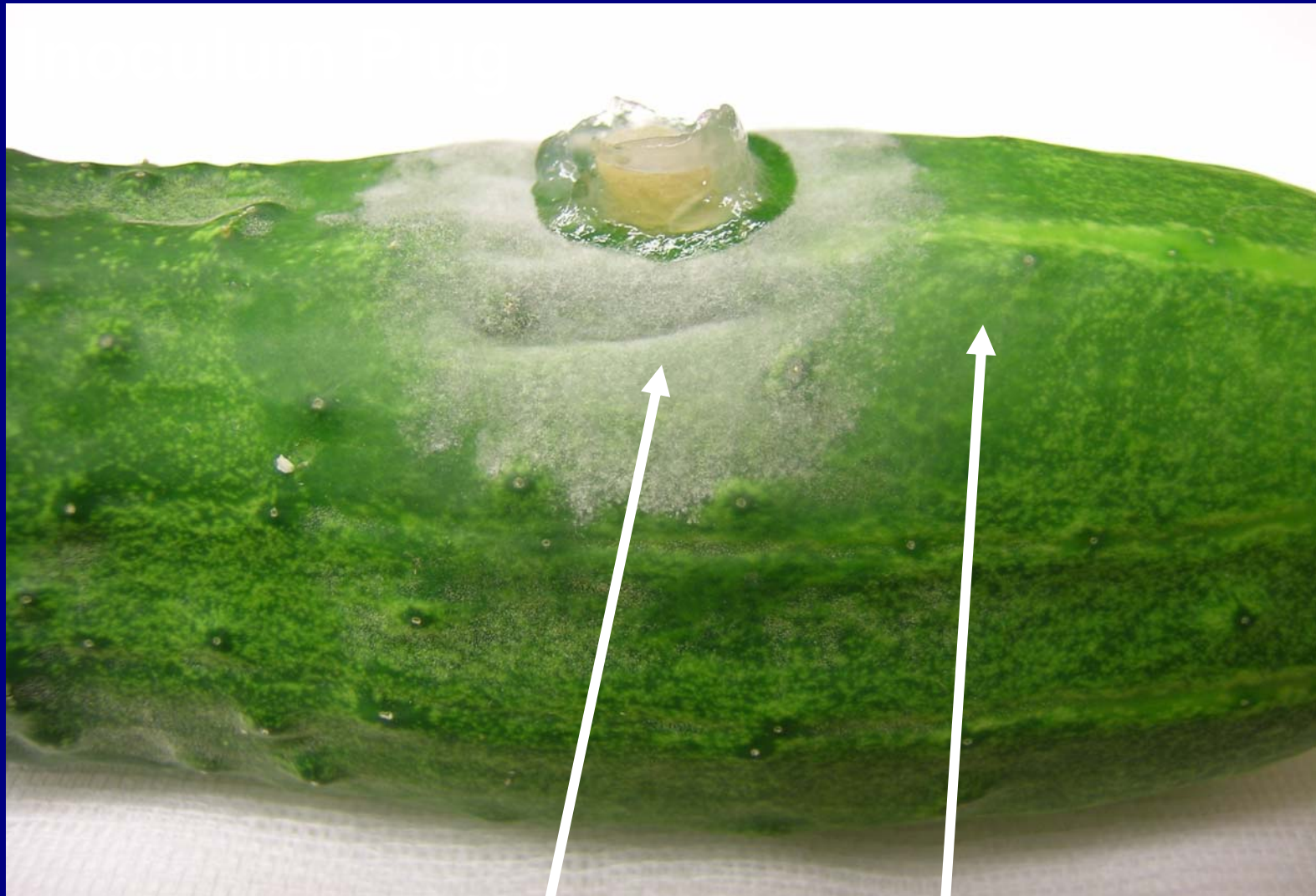- **PHI – plays a significant role for some crops.**

Cucumber vines appear to be relatively tolerant to *Phytophthora*
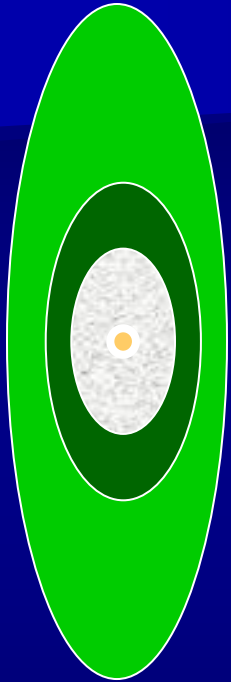
1", 3", 5" fruit

Inoculation Technique

Pathogen sporulation   **Water-soaking**

Disease Evaluation
3 days post-inoculation

Sporulation density (0-3 scale)

    0: none

    1: light sporulation

    2: moderate sporulation

    3: heavy sporulation

Sporulation diameter (cm)

Lesion diameter (cm)

Trt. #1
Untreated

Trt #2
Acrobat 6.4 oz/A
+ Kocide 1.50 lbs/A

Pickling Cucumber

Number of infected fruit

Treatments applied at 1", 3", 5" sized fruit
- Trial 2
- Trial 3

Conventional nozzles

Acrobat 50WP 6.4 oz + Kocide 2000 54WG 1.5 lb

Gavel 80WG 2 lb + Kocide 2000 54WG 1.5 lb

Untreated
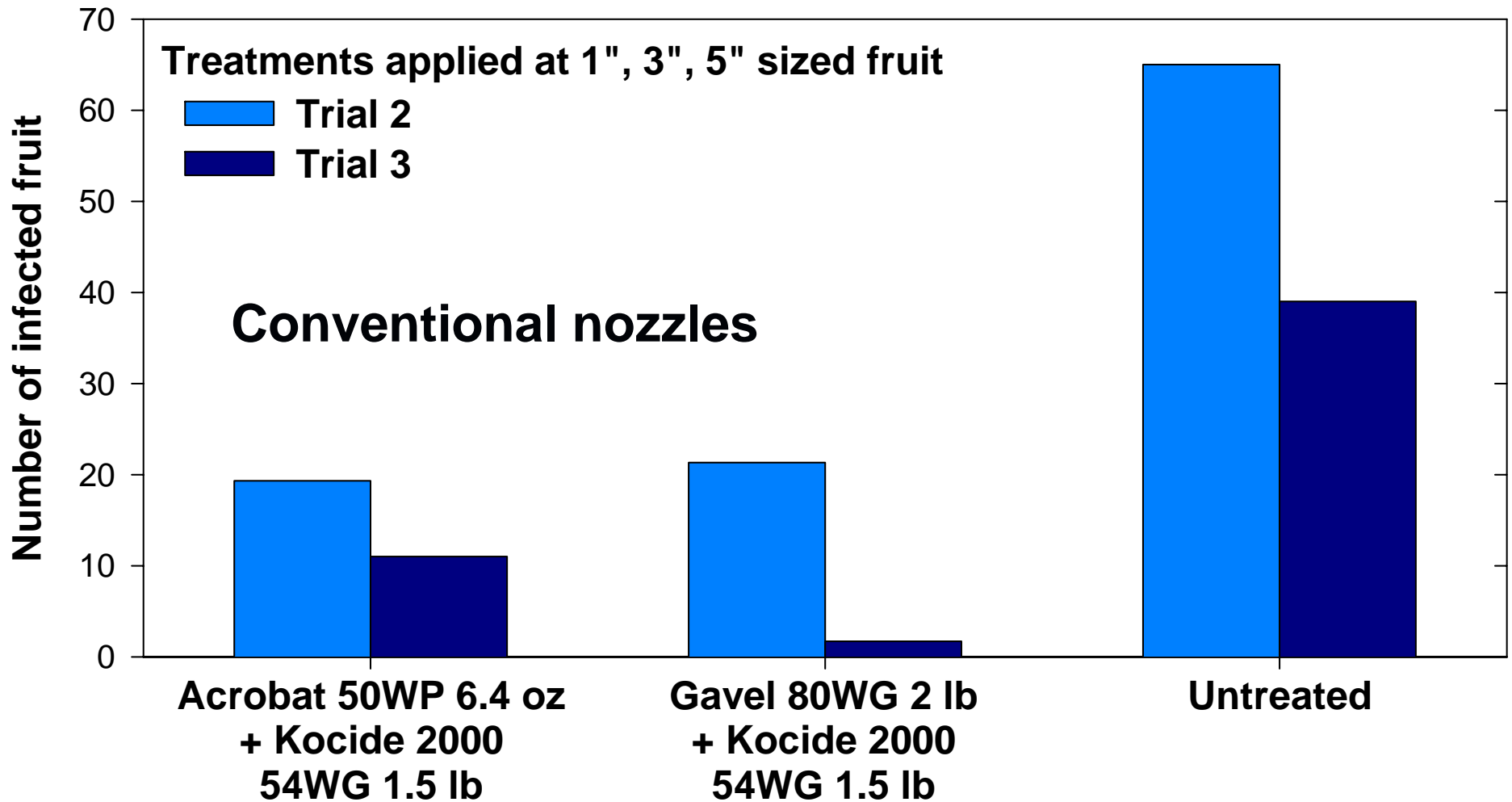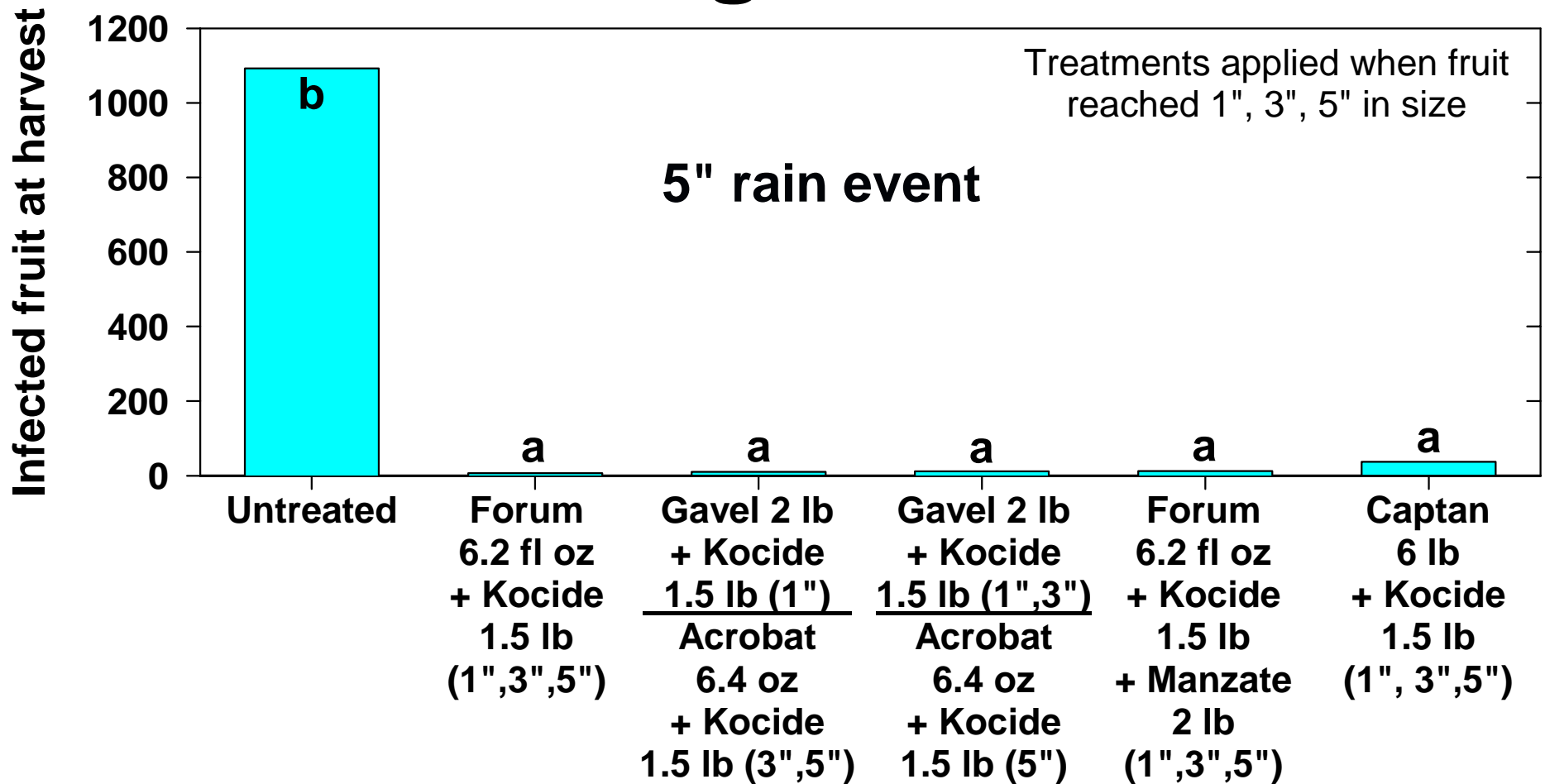
Spray Rigs

Conventional nozzles

Air-assisted nozzles

Pickling Cucumber

Infected fruit at harvest

Three sprays were applied.
All treatments were tankmixed with Kocide 2000 1.5 lb/A.
Bars with letters in common are not signicantly different.

c

b

ab

ab

a

Untreated	Air-assisted	Conventional nozzles		
	Acrobat 50WP 6.4 oz	Acrobat 50WP 6.4 oz	Zoxium 80WP 5.0 oz	Gavel 75DF 2.0 lb
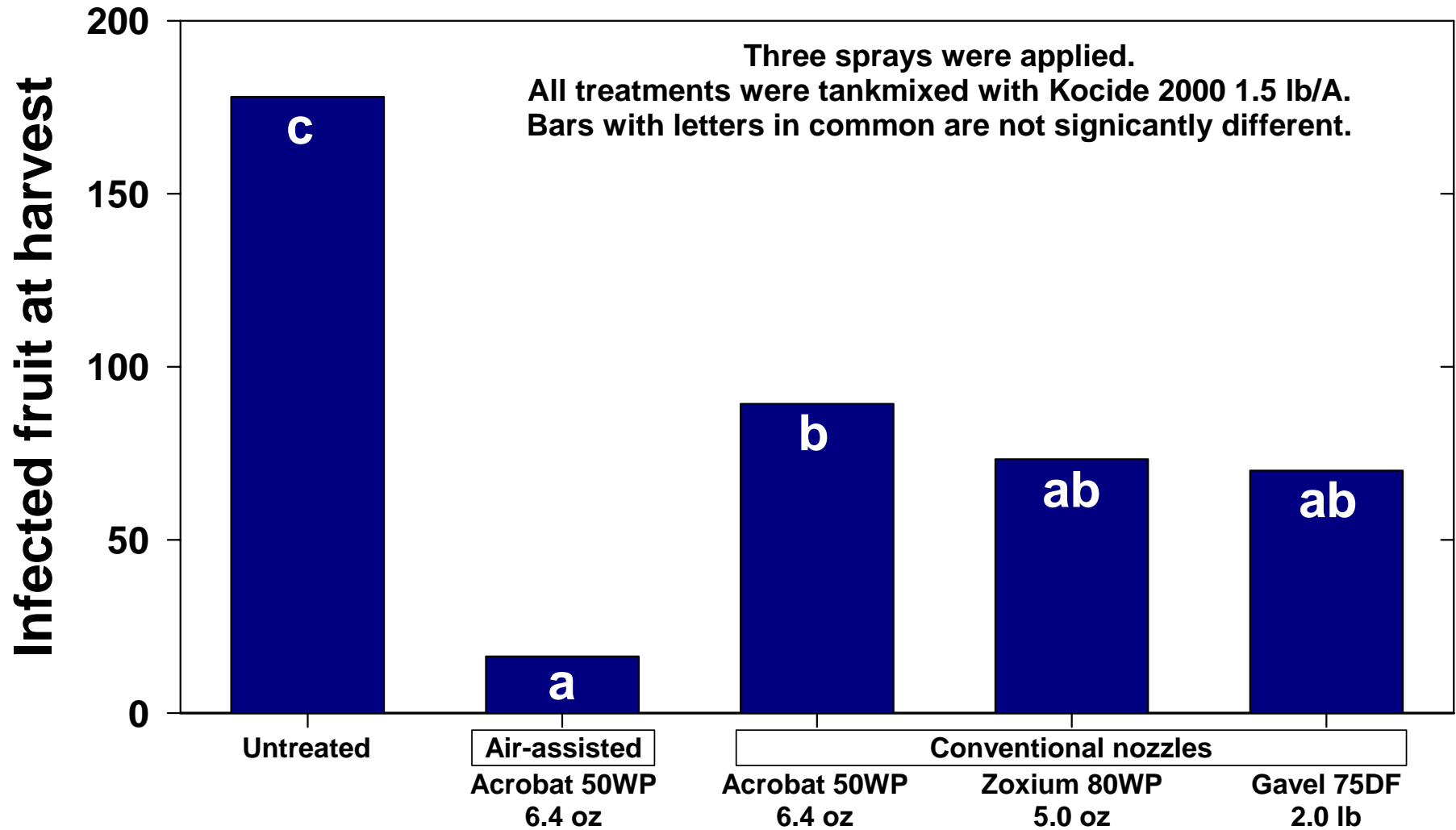
On many farms, *Phytophthora* has become resistant to Ridomil used for control.

Pepper

Plant death (%)

Rates are per A.
Bars with a letter in common
are not significantly different.

18 Aug

| Untreated | V-10162 5.73FL 1.75 pt | Ridomil Gold 1.6 pt | IR6141 0.21 lb + Remedier 2.2 lb | Remedier 4WP 2.2 lb | Ridomil Gold EC 25.6 fl oz | IR6141 50WP 2.1 lb | Ridomil Gold EC 25.6 fl oz | IR6141 50WP 2.1 lb |

~drench 7 days after transplant~

~7-day foliar spray~

Ridomil Gold Bravo 2 lb

~7-day foliar spray~

~drench 7 days before and after transplant~

~drench 7 days after transplant~

~drench 32 days after transplant and 29 days before harvest~

Can Fumigation Work?
Fumigation Studies

■ **Fumigation under plastic mulch.**

- – Very effective when combined with raised bed, black plastic, and drip irrigation.

- – Growers of fresh market vegetable crops have used this tool to successfully control *P. capsici* in combination with cultural strategies and fungicide sprays.

Untreated

MBr/Pic

Making the Most of Fungicides

- Maximize fungicide coverage.
- Keep spray intervals short.
- Apply <u>before</u> a rain.
- Come back quickly <u>after</u> a rain.
- Protect the fruit.
- Rotate with fungicides <u>proven to be helpful</u>.
- Tank mixes can be helpful and are required by some labels.