

Economics of Strawberry Production with Alternative Fumigants Watsonville

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Objective

- To estimate application rates that maximize profits for each alternative fumigant treatment
- To estimate the relative profitability of the alternatives
- To estimate the effect of using virtually impermeable film (VIF) rather than high-density polyethelene (HDPE)
- To estimate the effect of using VIF and/or metam sodium on profits (*separate trial*)

Field Trials

- 🍓 Locations (Oxnard, Watsonville)
- 🍓 Years (2002 – 2003, 2003 – 2004)
- 🍓 Fumigation (12 treatments)
 - PIC (50, 100, 200, 300, 400 lbs per acre)
 - Inline (50, 100, 200, 300, 400 lbs per acre)
 - Methyl Bromide (350 lbs. per acre)
 - None (control)
- 🍓 Two tarps for each treatment (VIF, HDPE)

Approach

- 🍓 Yield and weeding time data from trials
- 🍓 Fumigant and tarp prices provided by industry members and suppliers
- 🍓 University of California cost studies provided information on other costs
<http://coststudies.ucdavis.edu>
- 🍓 Profits calculated for each year, location, tarp and treatment combination

Costs and Returns

Costs that vary:

-  VIF versus standard film (HDPE)

-  Fumigant

-  Hand weeding

-  Harvesting labor and materials

 All other costs assumed to be constant

Returns:

-  Yields vary by treatment

-  Quality assumed to be constant

Caveat

Results are only as good as the data.

- 🍓 Field trial conditions may differ from field conditions.
- 🍓 Cost studies use information from a number of growers and suppliers but not a random sample.
- 🍓 Prices change over time.
- 🍓 Price of broadcast application of methyl bromide is **high** relative to drip application of chloropicrin or Inline.
 - 🍓 If your cost of applying fumigants with drip is substantially higher than \$50/acre, then your application rates of Inline and PIC EC that generates the same profits as MBr-PIC will also be higher.

Statistical Analysis

🍓 Relative profitability

🍓 Chloropicrin (PIC)

🍓 1,3 – D (Inline)

🍓 Methyl bromide (MBr)

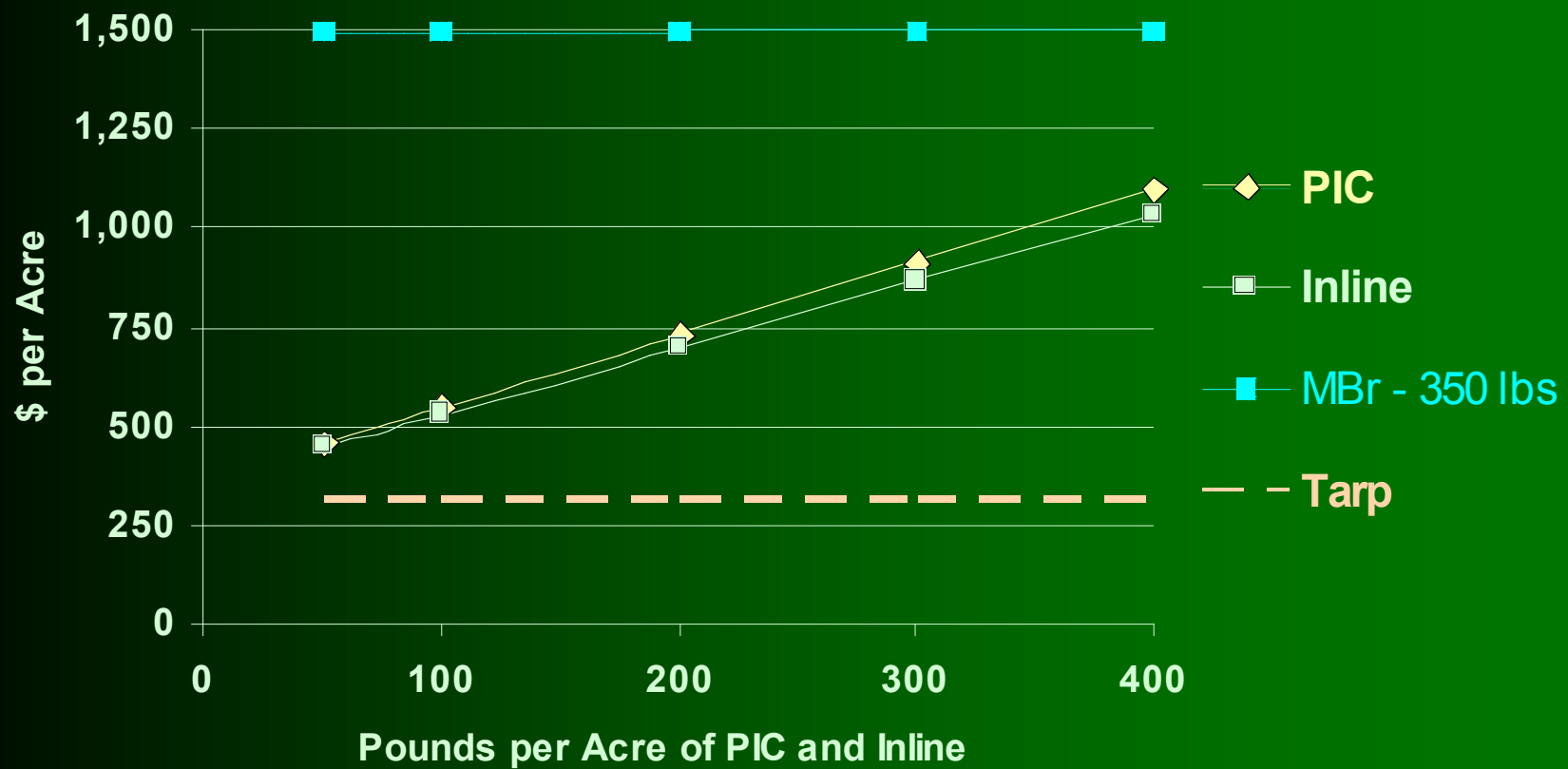
🍓 Profit maximizing rates (PIC, Inline)

🍓 Change in profit from switching to PIC or Inline from MBr

🍓 Change in profits from switching to VIF from HDPE

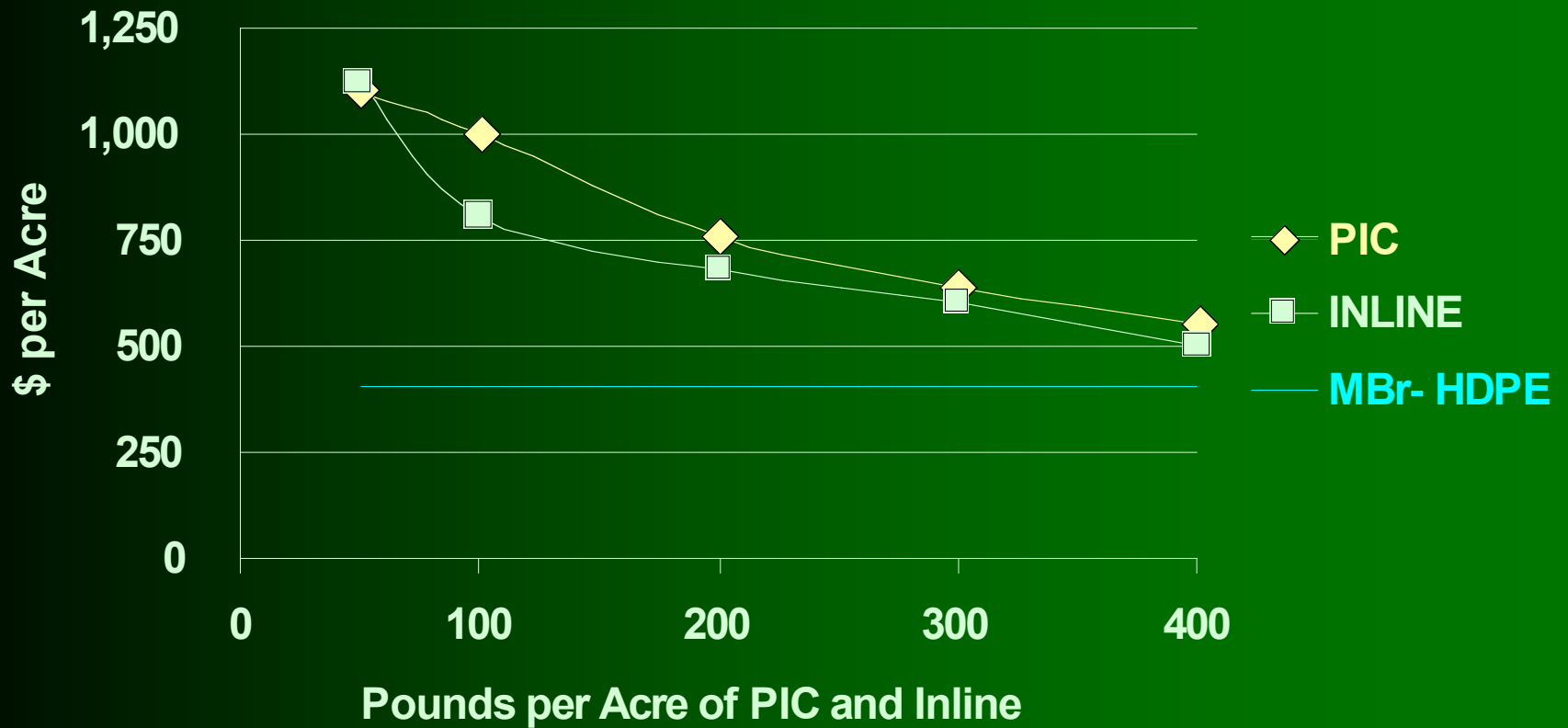
Watsonville

Fumigation Cost with HDPE



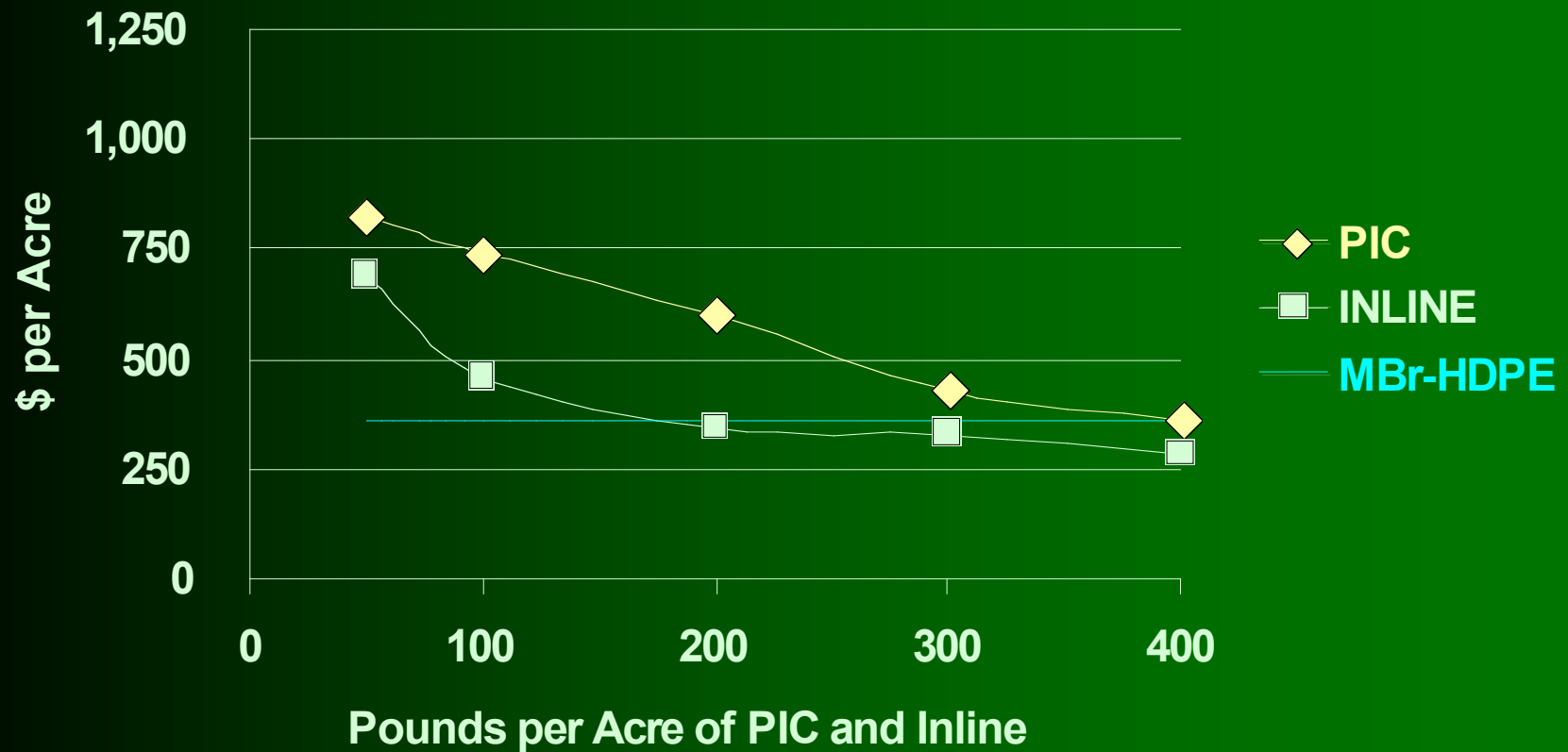
Watsonville

Hand Weeding Costs with HDPE

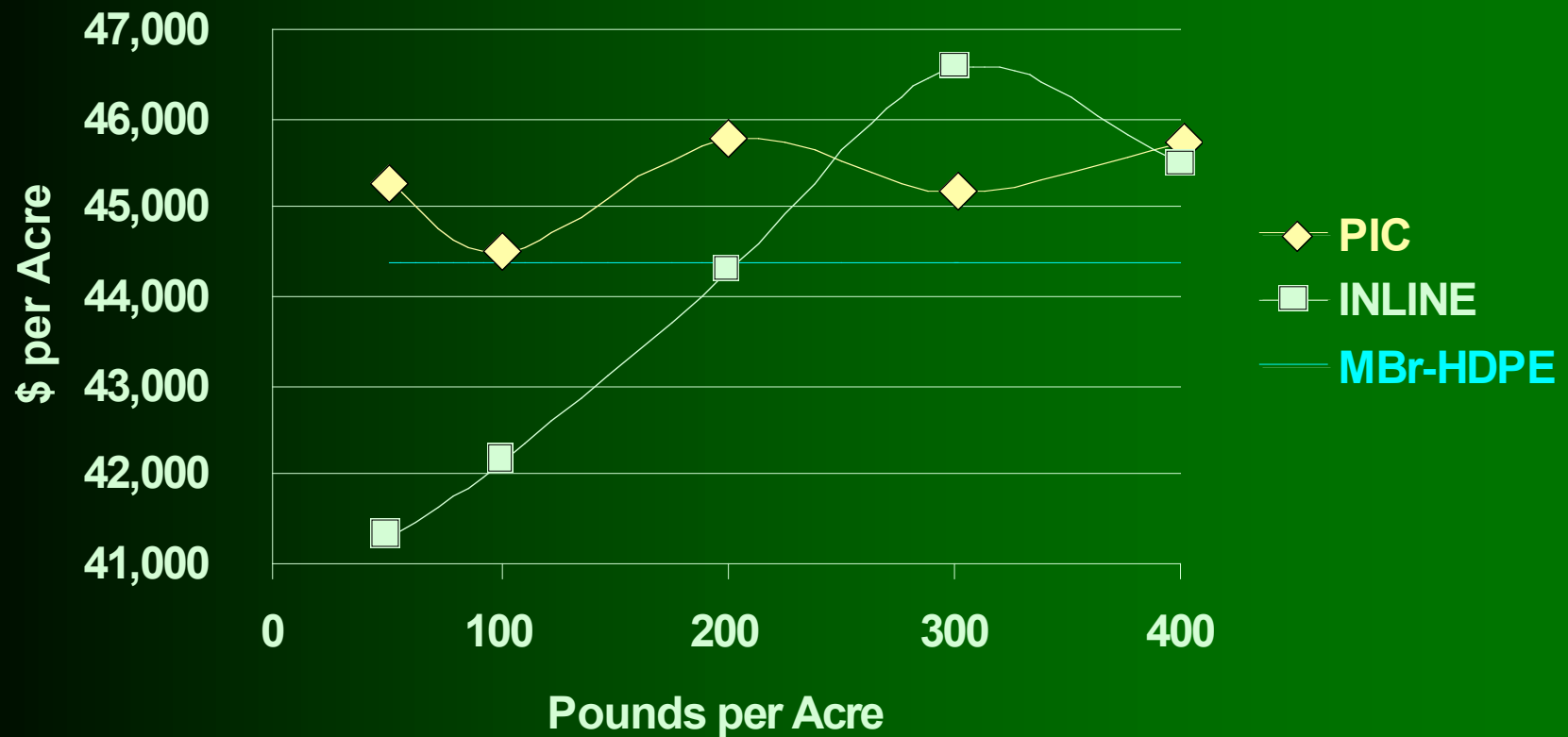


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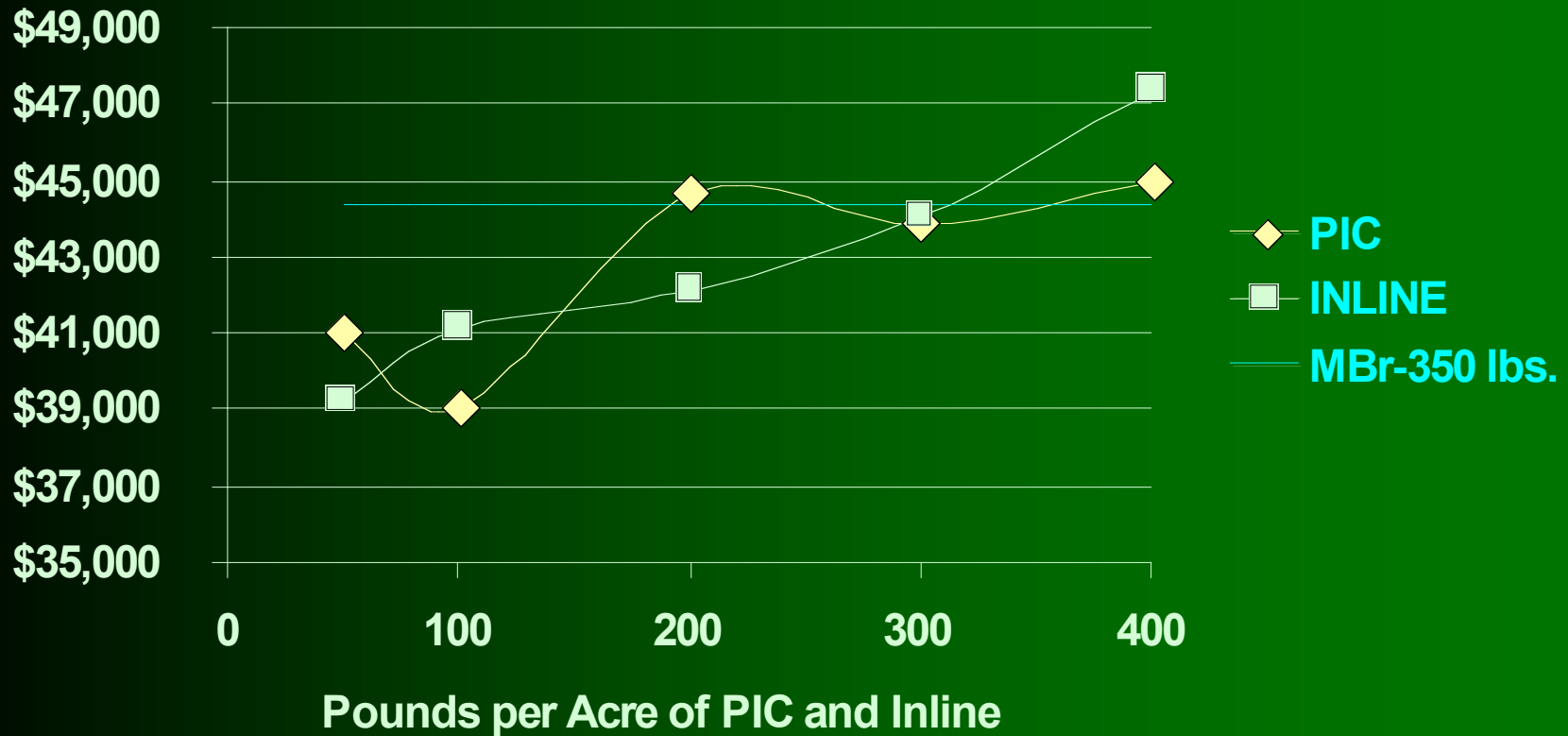
Hand Weeding Costs with VIF



Watsonville Revenue with VIF



Watsonville Revenue with HDPE



Watsonville 2002 - 2003

Chloropicrin Profits by Application Rate as Percentage of MBr HDPE Profits



Results

- Calculate profit-maximizing rates for PIC and Inline
 - Compare profits by treatment at profit maximizing rates to profits from MBr at 350 lbs/acre
3. Compare profits with VIF to using HDPE for PIC and Inline

Watsonville

Estimated Profit-Maximizing Rates (lbs/acre)

	2002-03	2003-04	Both Yrs
PIC	259	267	259
INLINE	353	381	368

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Estimated Profit Increase Compared to MBr 350 lbs. per Acre*

		2002-03	2003-04
PIC	VIF	\$1,065	\$1,846
	HDPE	1,325	676
Inline	VIF	446	2,026
	HDPE	1,906	676

* Estimated using profit-maximizing rates

Watsonville

Estimated profit change from using VIF (\$/acre)

	2002-2003	2003-2004	Both Years
PIC	-\$260	\$1,170	\$455
INLINE	-\$1,459**	\$1,350**	-\$55

PIC application rate 260 lbs/acre

INLINE application rate 370 lbs/acre

** Significant at the 5% level

Summary: Watsonville

- 🍓 Drip-applied chloropicrin and Inline more profitable than methyl bromide
- 🍓 Profit maximizing rates
 - 🍓 PIC approx. 260 lbs./acre
 - 🍓 Inline approx. 375 lbs./acre
- 🍓 Effect of VIF on profits isn't consistent

VIF and Metam Sodium Field Trial

- 🍓 Location: Oxnard
- 🍓 Years: 2001 – 2002
- 🍓 Fumigation (5 treatments)
 - 🍓 PIC EC (22 gallons per acre, drip-applied)
 - 🍓 Inline (36 gallons per acre, drip-applied)
 - 🍓 Telone C35 (33 gallons per acre, shank-applied)
 - 🍓 PIC (33 gallons per acre, shank-applied)
 - 🍓 Methyl Bromide (375 lbs. per acre, shank-applied)
- 🍓 Two tarps for each treatment (VIF, HDPE)
 - 🍓 Metam sodium (45 gallons per acre, drip-applied separately)
 - 🍓 No Metam sodium

Metam Sodium Study Approach

- 🍓 Data collection, costs and returns same as in first study
- 🍓 Statistical analysis
 - 🍓 Profitability of using VIF
 - 🍓 Profitability of using metam sodium
 - 🍓 Profitability of using both
 - 🍓 Can only do changes in profits, not profit-maximizing rates

Profitability of Fumigants

- 🍓 All alternatives in this trial less profitable than methyl bromide
 - 🍓 Only one application rate for each alternative fumigant, so result is only for those specific rates
 - 🍓 For PIC EC, profit-maximizing rates from other trial suggest may be partially because the rate was too high (approx. 360 lbs./acre)

Effect on profitability of VIF and Metam Sodium

(change as percent of MBr-PIC HDPE returns)

	Metam sodium	No metam sodium
VIF	45.9%	29.9%
HDPE	41.2%	---

Summary: Metam sodium and VIF

- 🍓 VIF increases profits
- 🍓 Metam sodium increases profits
- 🍓 Using both increases profits more than using either one alone
- 🍓 Results based on Oxnard-only trial