LEADERSHIP IN REDUCING VOCs FROM SOIL APPLIED PESTICIDES –

The UCI PM Story

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Integrated Pest Management
Program mandate since 1979:

“Protect Human Health
and Reduce Pesticide
Impact on the Environment”
UCI PM programs are based on complementary and interactive approaches:

Research  ↔  Education
UCI PM-Administered Competitive Research Grant Programs:

- Core Research Grants (current)
- Exotic/Invasive Pests & Diseases Research Grants
- Smith-Lever Implementation Grants
UCI PM Education/Extension Resources:

- Personnel
- Manuals & IPM Guidelines
- Websites
Alternatives to Soil Fumigants for mitigation of:

- Atmospheric ozone depletion
- VOC air pollution
UCI PM has sponsored more than 100 multi-year research and education projects (1979-2007) targeting soilborne:

- Pathogens
- Nematodes
- Weed propagules
- Insects
Cultural/ Physical/ Chemical Approaches:

- Water/ nutrient mgt.
  - Avoidance
- Tillage modifications
  - Solarization
- Biofumigation/ Crop Rotation/ Cover Crop
- Reduced risk pesticides
Biological Approaches:

• Predation/Parasitism/Competition
• Soil community alterations
• Host plant resistance
Several projects funded by UCI PM have explored soil treatment by:

• Solarization

and

• Biofumigation
“Double-tent” solarization has been approved by CDFA for production of nematode-free nursery stock

Adapted from CDFA
Solarization - What are the Limitations?

* Climate/Weather
* Land out of production during summer(?)
* “Top-down heating”
* Some resistant pests
* Few “product reps”
FILM TECHNOLOGY NEEDS:

* Polymer composition
* Permeability
* Durability (multi-purpose?)
* Recycling/Disposal
BI OFUMIGATION

Release of biotoxic compounds from organic materials (roots or residues of cash or cover crops; green manures) during growth or decomposition in soil, which results in reduction of pest organism populations or activity.
How does BIOFUMIGATION Work?
Biofumigation Mode of Action:

Biotoxic Compounds
(Brassica sources most used to date)

- Glucosinolate hydrolysis (isothiocyanates)
- Other compounds (sulfides, sulfoxides, mercaptans, aldehydes, etc.)

in soil vapor and aqueous phases
Biofumigation Mode of Action:

Increased or altered biological activity in soil leading to

Microbial Antagonism
Biofumigation - What are the Limitations?

* Frequent mild efficacy or treatment unpredictability
* May need tarp/solarization
* May require growing cover or green manure crop
* Few “product reps”
Be aware of possible Phytotoxicity (allelopathy) to following crop
ALTERNATIVES TO FUMIGANTS

Situation-Specific Combinations Of Treatments =

INTEGRATED MANAGEMENT
References:

UNIVERSITY OF CALIFORNIA
STATEWIDE IPM PROGRAM
WEBSITE:

http://ipm.ucdavis.edu
http://solar.uckac.edu
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