

# SOIL FUMIGATION

STEVE GODBEHERE

Forest Tree Nursery Management  
Short Course

Auburn University – August 30, 2005



# SOIL FUMIGATION

- CHEMICAL CONTROL STRATEGY USED TO REDUCE POPULATIONS OF SOIL ORGANISMS
  - NEMATODES
  - FUNGI
  - BACTERIA
  - INSECTS
  - WEED SEED
  - WEEDS



# AGENDA

- GENERAL SOIL FUMIGATION
- KEYS TO SUCCESSFUL SOIL FUMIGATION
- FUMIGATION SAFETY
- INFRASTRUCTURE
- SUPPLY AND LEGISLATIVE ISSUES

# SOIL FUMIGATION USES

- AGRICULTURE
- ORCHARDS
- NURSERIES
- ORNAMENTAL BEDDING
- FOREST SYSTEMS
- WILD FLOWER PROJECTS
- GOLF COURSES
- ATHLETIC FIELDS
- WHITE HOUSE LAWN



# SOIL FUMIGATION

- Solid Tarp
- Greenhouse
- Row or Bed
- Potting Mix
- Hot Gas
- Replanting Orchard Sites

# SOLID TARP





# ROW OR BED FUMIGATION





















# POTTING MIX





# **KEYS TO SUCCESSFUL SOIL FUMIGATION**

# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation



# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation
- Soil Temperature



# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation
- Soil Temperature
- Soil Moisture



# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation
- Soil Temperature
- Soil Moisture
- Fumigant

# USE THE CORRECT FUMIGANT FOR THE TARGET PEST

98-2

Telone

Pic-Chlor 60

75-25

?

?

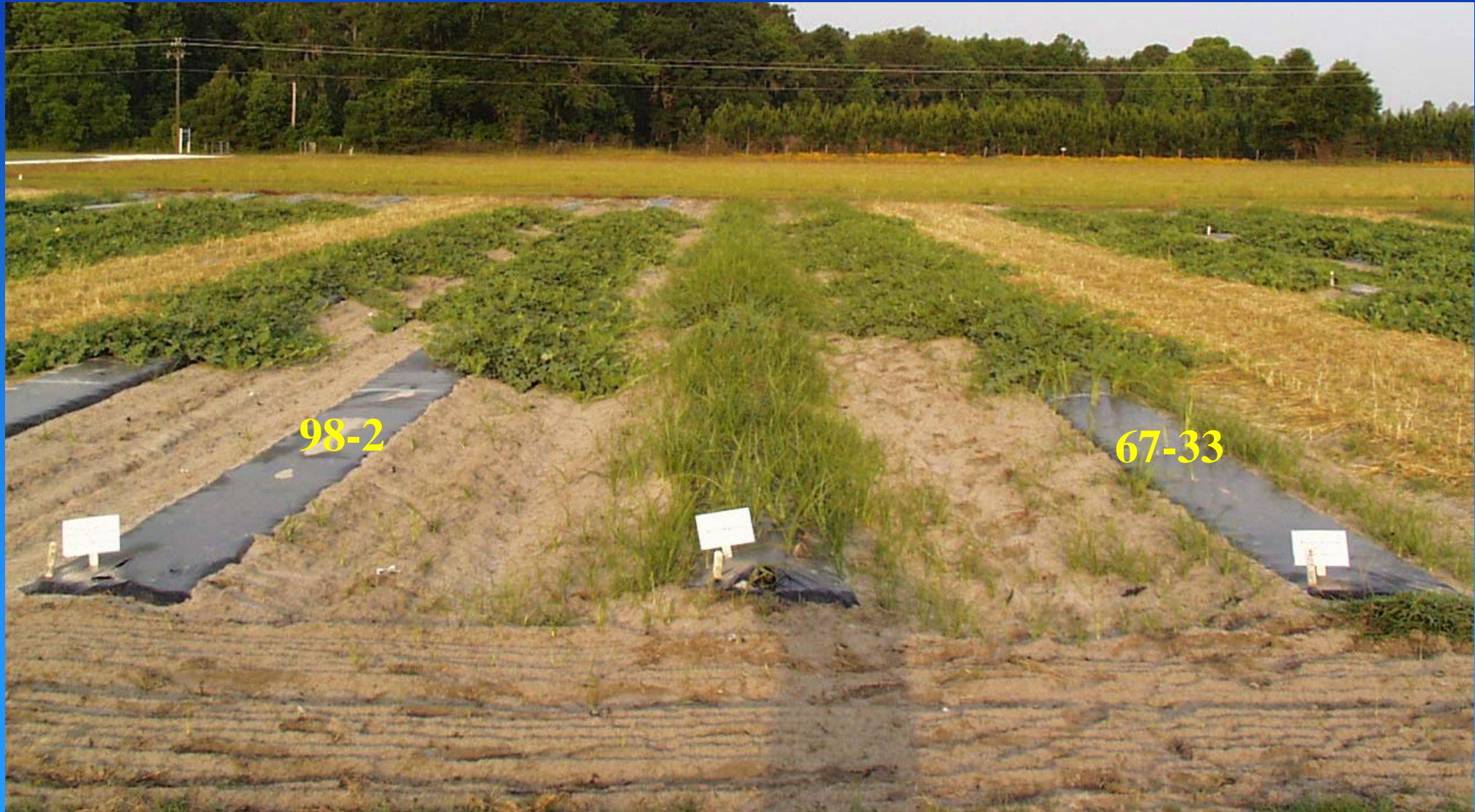
?

80-20

CHLOROPICRIN 100

67-33

# USE THE CORRECT FUMIGANT



# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation
- Soil Temperature
- Soil Moisture
- Fumigant
- Injection Depth



# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation
- Soil Temperature
- Soil Moisture
- Fumigant
- Injection Depth
- Sealing

# KEYS TO SUCCESSFUL SOIL FUMIGATION

- Soil Preparation
- Soil Temperature
- Soil Moisture
- Fumigant
- Injection Depth
- Sealing
- Soil Aeration

# KEYS TO SUCCESSFUL SOIL FUMIGATION

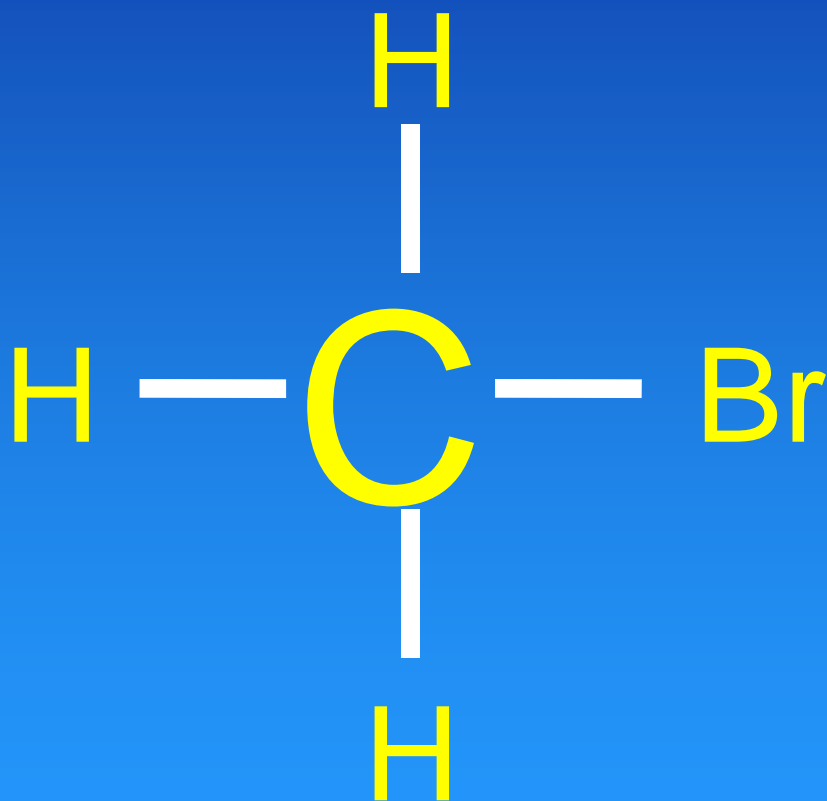
- Soil Preparation
- Soil Temperature
- Soil Moisture
- Fumigant
- Injection Depth
- Sealing
- Soil Aeration
- Waiting Period

# FUMIGATION SAFETY

- **Characteristics of Methyl Bromide and Chloropicrin**
- **Potential Hazards**
- **Prevention / Protection**
- **First Aid / Emergency Response**



# METHYL BROMIDE



# METHYL BROMIDE

- Naturally occurring molecule
- Non-flammable
- Boils at 38.5 degrees F
- 3.27 times heavier than air
- Practically insoluble
- Odorless and Colorless

# **METHYL BROMIDE TOXICITY**

## **RESPIRATORY TRACT**

- **Symptoms: Dizziness, Headache, Nausea, and Vomiting**
- **Lung Edema**
- **Cardiac Irregularities**
- **Possible Death**
- **Symptoms Can Be Delayed**

# CHLOROPICRIN

- Lachrymator
- 5.7 times heavier than air
- Colorless
- Respiratory Irritant
- TLV-0.1 ppm
- Liquid

# **DANGER**

**This product contains CHLOROPICRIN as a warning odorant. Chloropicrin may be irritating to the upper respiratory tract, and may cause painful irritation to the eyes, producing watering. If the symptoms occur, leave the fumigation area immediately.**



# SAFETY MEASURES TO AVOID RESPIRATORY INJURY

- Begin Application on the Downwind Side of Field
- Pressure Check All Plumbing on Tractor With Nitrogen
- Repair Any Rips or Holes in Plastic Promptly
- Never Install Fumigation Plumbing Inside Enclosed Tractor Cab
- Replace Worn Chisels

# PRACTICAL TREATMENT

- IF INHALED
  - Fresh air, stay warm, artificial respiration
- IF ON SKIN
  - Remove clothing, wash with soap and water
- IF IN EYES
  - Flush with water for at least 15 minutes

**Go to a doctor or emergency treatment facility  
as soon as possible!**

# INFRASTRUCTURE











0970

CE  
ES  
GLA

GREEN LAMPS CHEMICAL  
STORAGE

76235  
SAL G  
ITS  
NET WT. 1000 LB  
GROSS WT. 1100 LB  
DATE 10/10/00

CANX 76235  
100 LBS. INDUSTRIAL GAS  
100 LBS. INDUSTRIAL GAS









# CYLINDER RECERTIFICATION









































STARTING # of

DATE	PIGS	CYL.
9/25	982A-1	
9/25	982C-3	











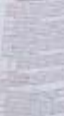
RESTRICTED USE PESTICIDE  
CHLOROPICRIN 100  
FUMIGANT

RESTRICTED USE PESTICIDE  
CHLOROPICRIN 100  
FUMIGANT

CHLOROPICRIN 100  
FUMIGANT

KEEP OUT OF REACH OF CHILDREN  
DANGER POISON PELIGRO

KEEP OUT OF REACH OF CHILDREN  
DANGER POISON PELIGRO







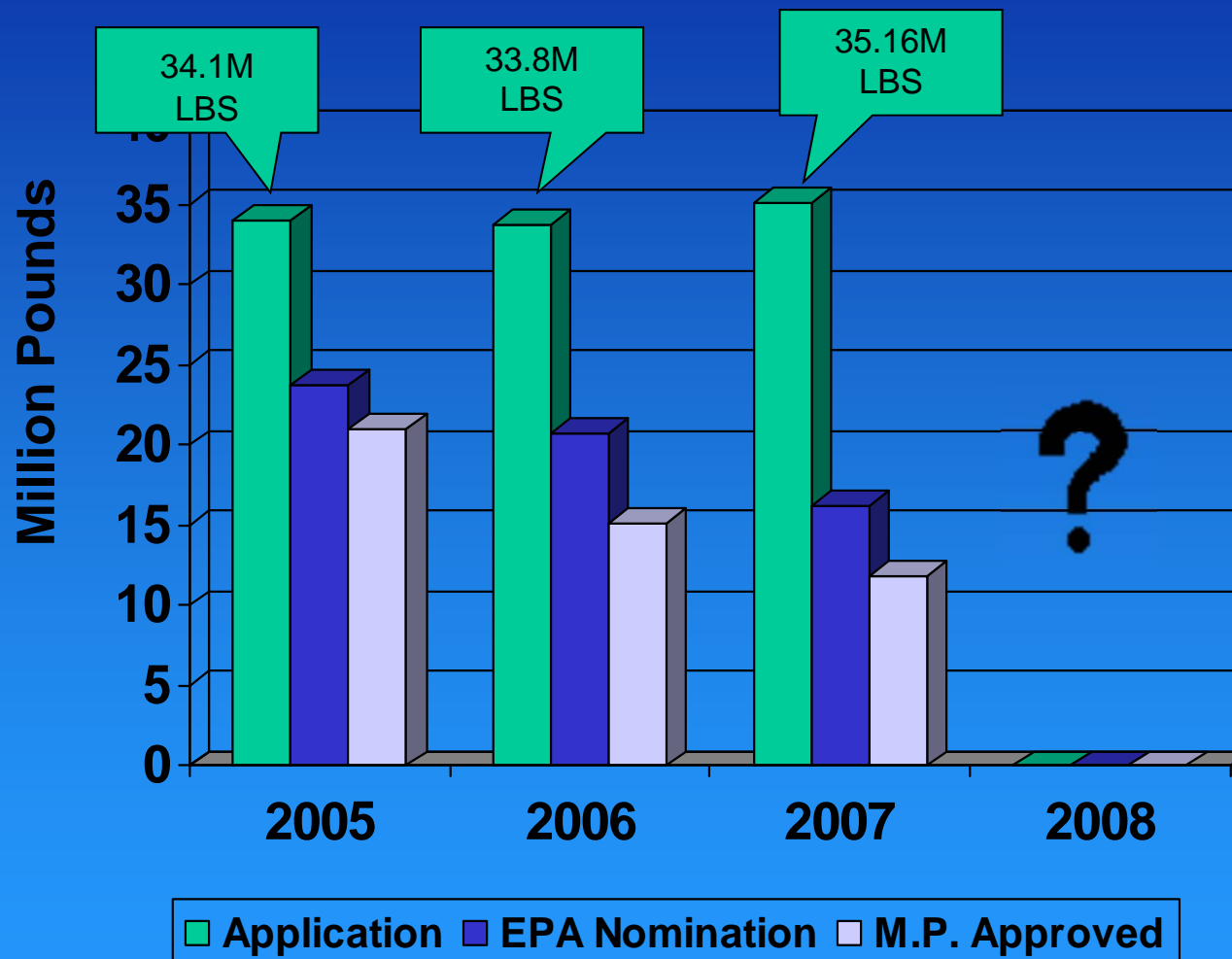
# **MB SUPPLY AND LEGISLATIVE ISSUES**



# MB SUPPLY

- QPS
- CUE
- INVENTORY

# U.S. CUE End-User Applications



# HOW BAD IS METHYL BROMIDE?

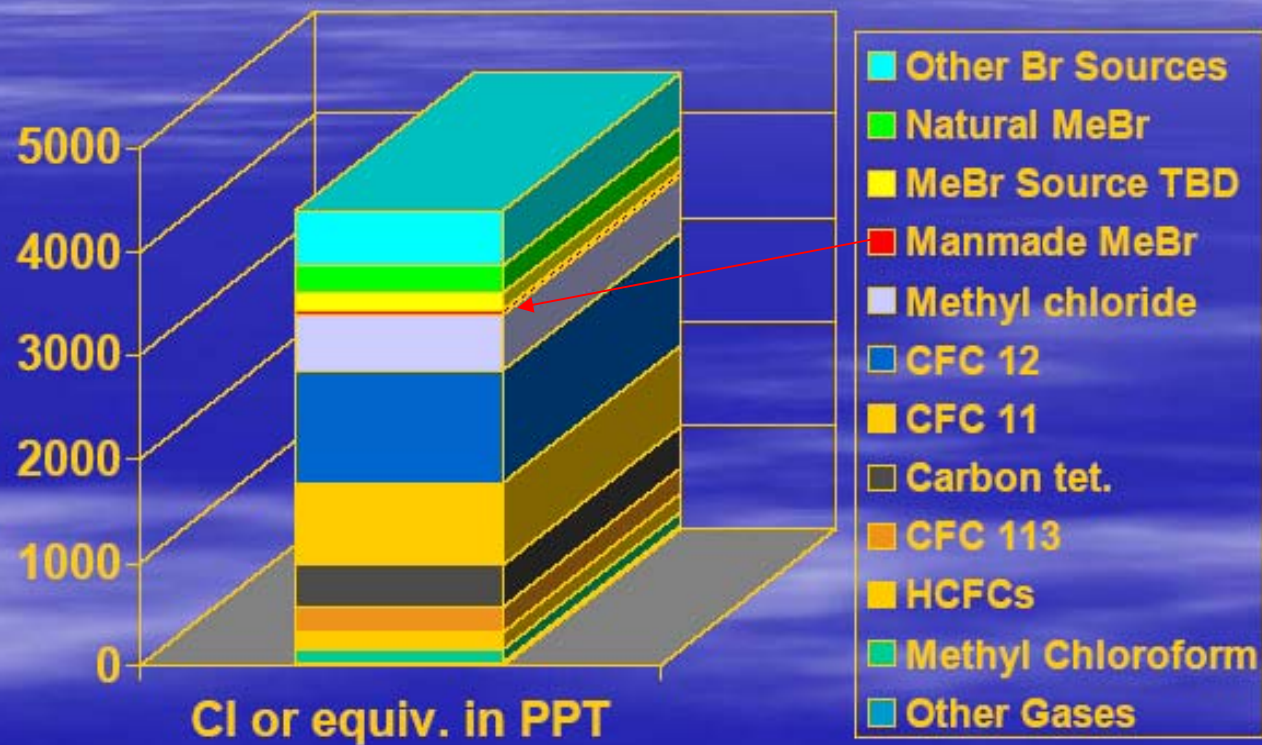
---

- **POMBO HEARINGS**
  - 99.6% OF TOTAL MB IS NATURAL
  - 0.4% IS MAN MADE
  - OTHER ESTIMATES LESS THAN 1% MAN MADE
- **OZONE DEPLETION POTENTIAL DOWN TO 0.4**



# Politics – Not Science

## ODP Sources in Stratosphere



The law of diminishing returns !

