

# **Metham-sodium and other alternatives to MB**

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(introduction)

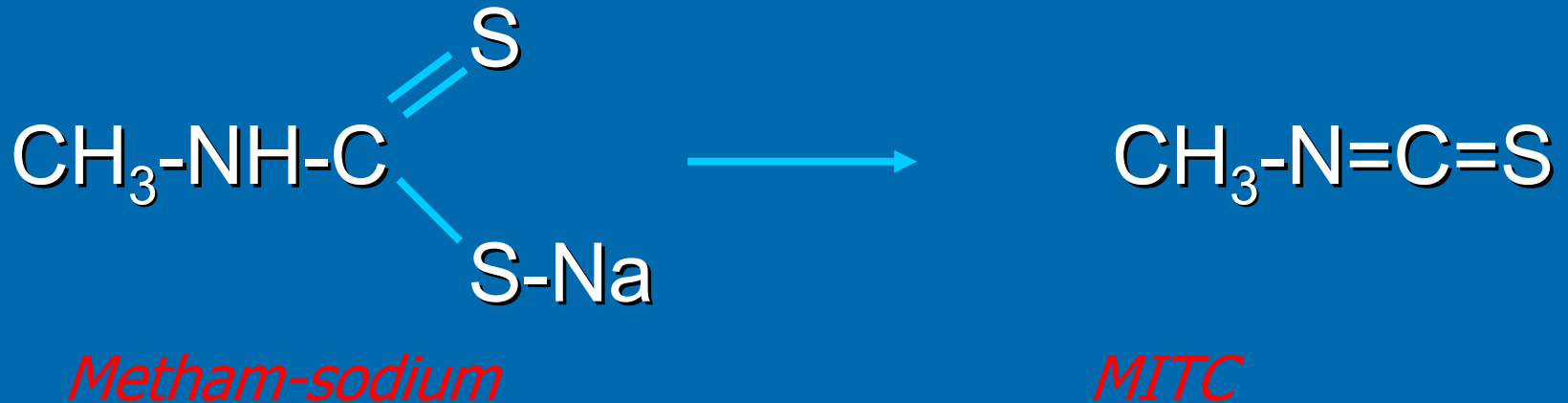
# Alternative for MB

- Metham-Sodium (MITC generators)
- Soil steaming
- Soil less (i.e. substrate)
- Bio-fumigation – Solarization
- Beneficial organism ( Trichoderma )
- IPM

# What is Metham-Sodium ?

- Multi purpose soil fumigant
- Used for intensive cropping
- Registered and used world-wide
- Safe for the user
- Safe for the environment
- No detectable residues
- Alternative to Methyl-bromide

# Chemical formula



- MITC is the active ingredient
- MITC is fully degraded after 2-3 weeks

# Why Metham-Sodium

- To reduce plant diseases
- Remedy against soil borne pests like:
  - Fungi
  - Nematodes
  - Weeds
- Beneficial side effects
  - Destruction of weeds
  - Growth stimulation

# Application of Metham-Sodium

- Main applications methods:
  - Drip irrigation
  - Sprinkler or watering can
  - Shank injector
  - Rotary spading injector
- Complete treatment takes 2-3 weeks  
( depending on soil temperature )
  - Open soil one week after treatment
  - Cress test for fumigant residues
  - Plant or sow

# Conditions for application

- Soil-temperature  $> 10^{\circ}$  C
- Correct moisture level in soil  
Free of crop residues
- Adapt equipment
- Good distribution of metham sodium

# Drip irrigation

re-usable device



**Dose unit and drip lines**



# Drip-irrigation

re-usable device



# APPLICATION

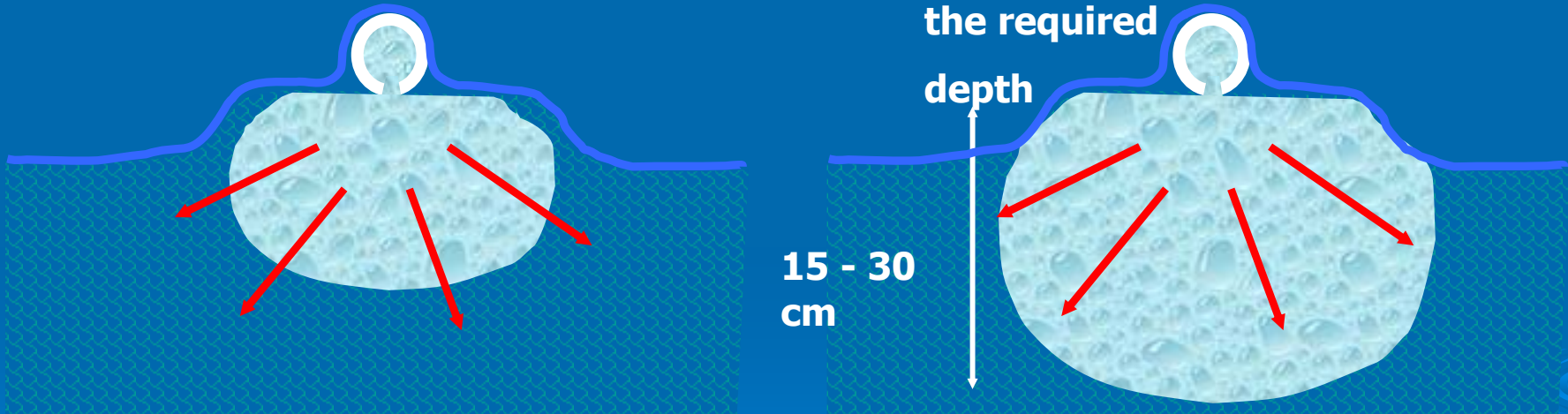
# drip-irrigation

metham diluted  
1-5% in water

10-40 mm of dilution  
in order to reach  
the required  
depth

15 - 30  
cm

**INCORPORATION with water front**



# Rotary spading injector machine gives the best results

- Closed system
- Safest method
- MS dose adapt to driving speed
- MS consumption from 300 to 1200 l/ha
- Whole width and depth
- Injection depth  $\frac{1}{2}$  the working depth
- Spading depth up to 35 cm



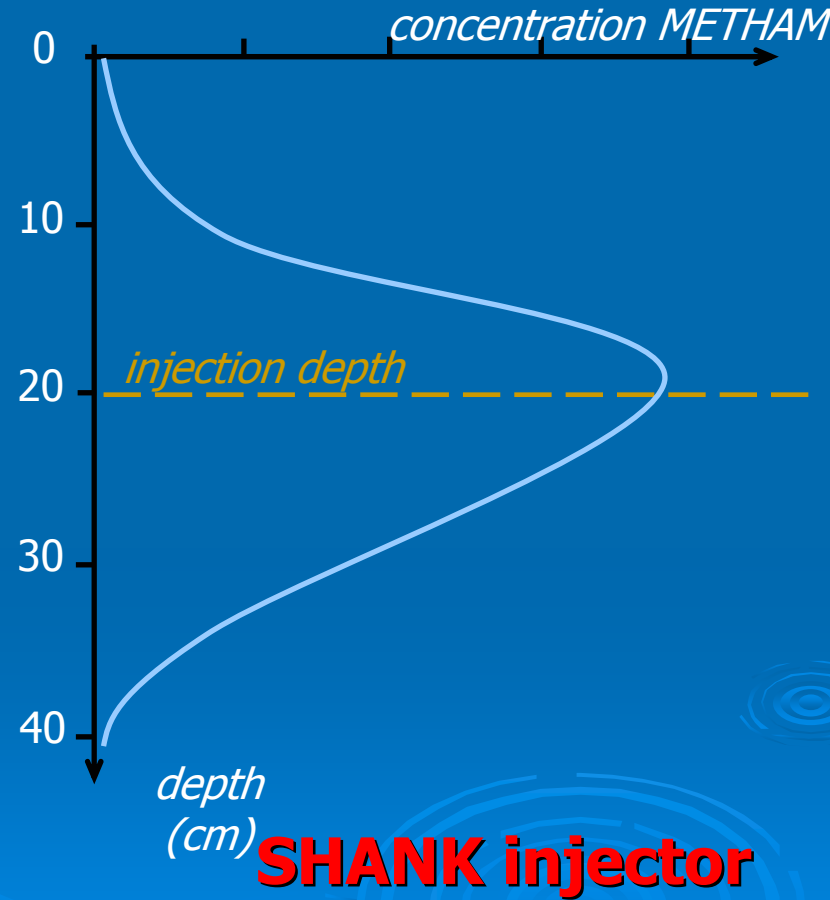
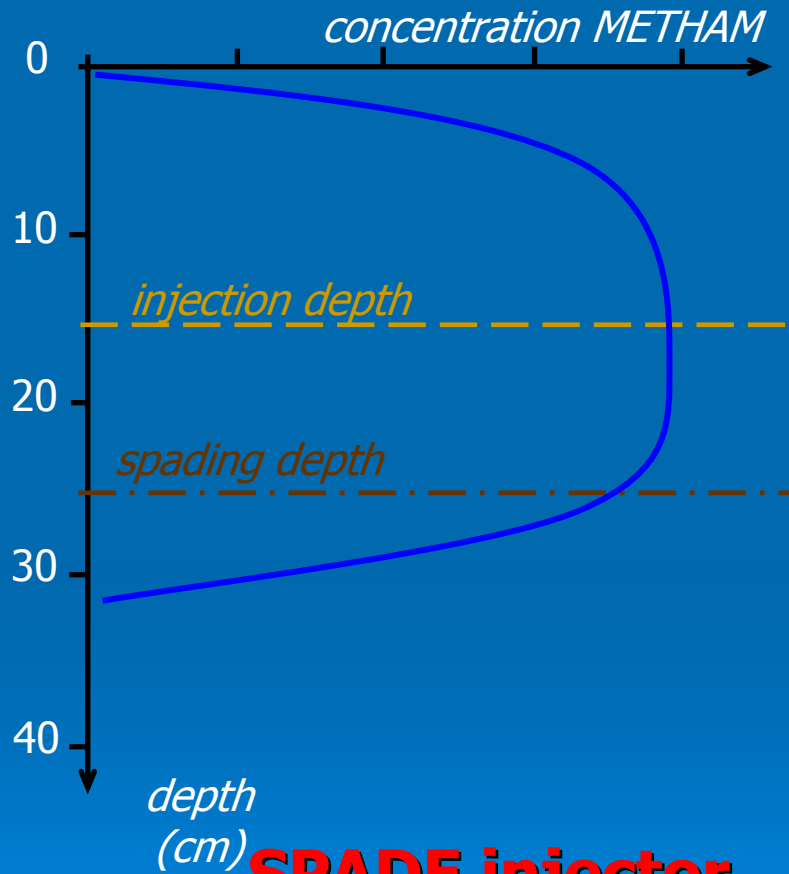
**Rotary spading injector machine with front injection**



**Spading injection machine 150 cm width in France**

# APPLICATION

# injection



# Autumn application



# Final result





# Soil less ( substrate )



# After 50 days



# Carnations on substrate



# Soil Steaming



# Mobile steam boiler



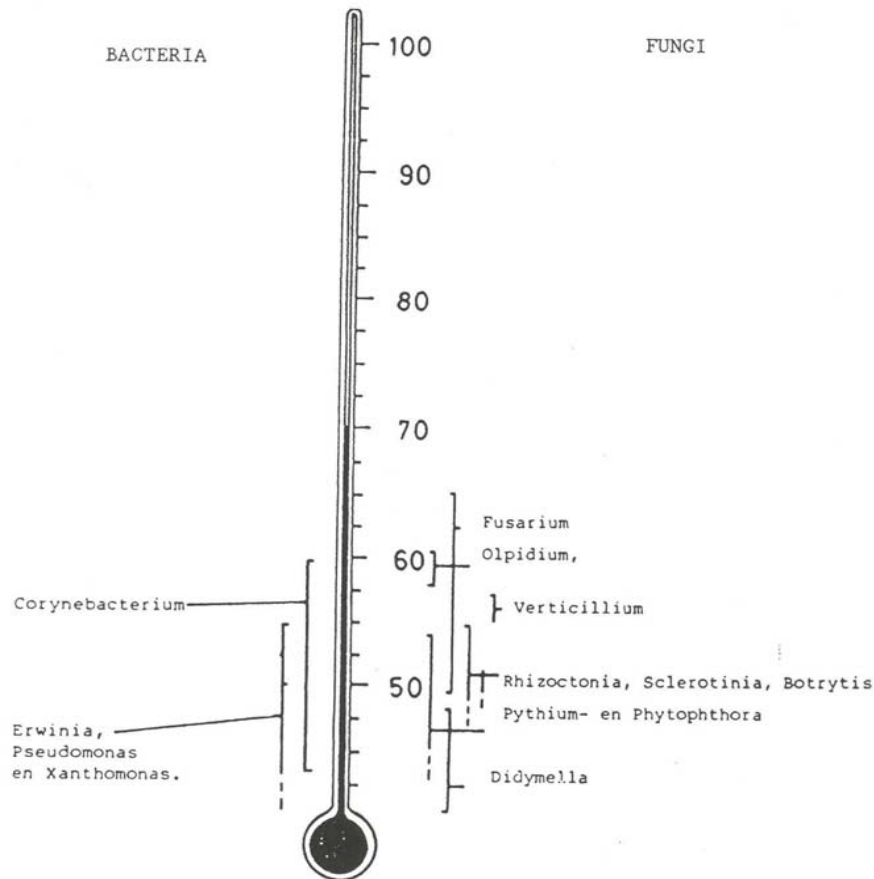
# Example from good and bad steaming



# Lethal temperatures

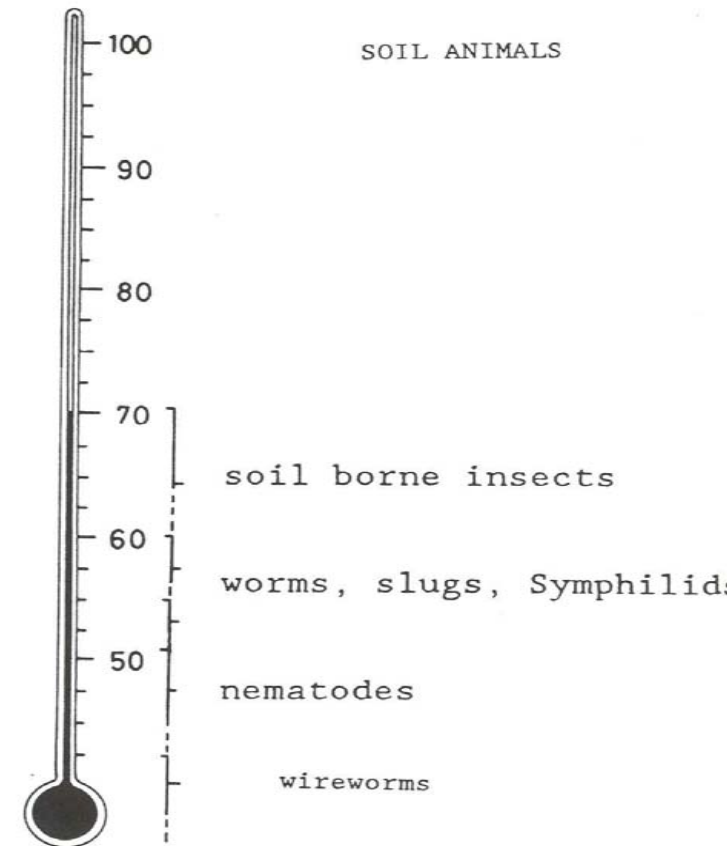
## LETHAL TEMPERATURES OF PLANT PATHOGENIC MICRO-ORGANISMS

IN SOIL - EXPOSURE TIME 30 MINUTES



## LETHAL TEMPERATURES OF SOIL ORGANISMS

EXPOSURE TIME 30 MINUTES



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