



# Sclerotinia in horticultural crops – integrated management

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*Sclerotinia sclerotiorum*



*Sclerotinia minor*

# Managing Sclerotinia diseases 1997-2007

- Short term during crop period
  - Agronomy / crop management
  - Reduce disease conducive conditions
  - Optimise chemical control
- Long term between crops
  - Pre-plant treatment - reduce sclerotia in soil
  - Crop rotations, biofumigant crops - break disease cycle
  - Soil health - microbial diversity, soil structure

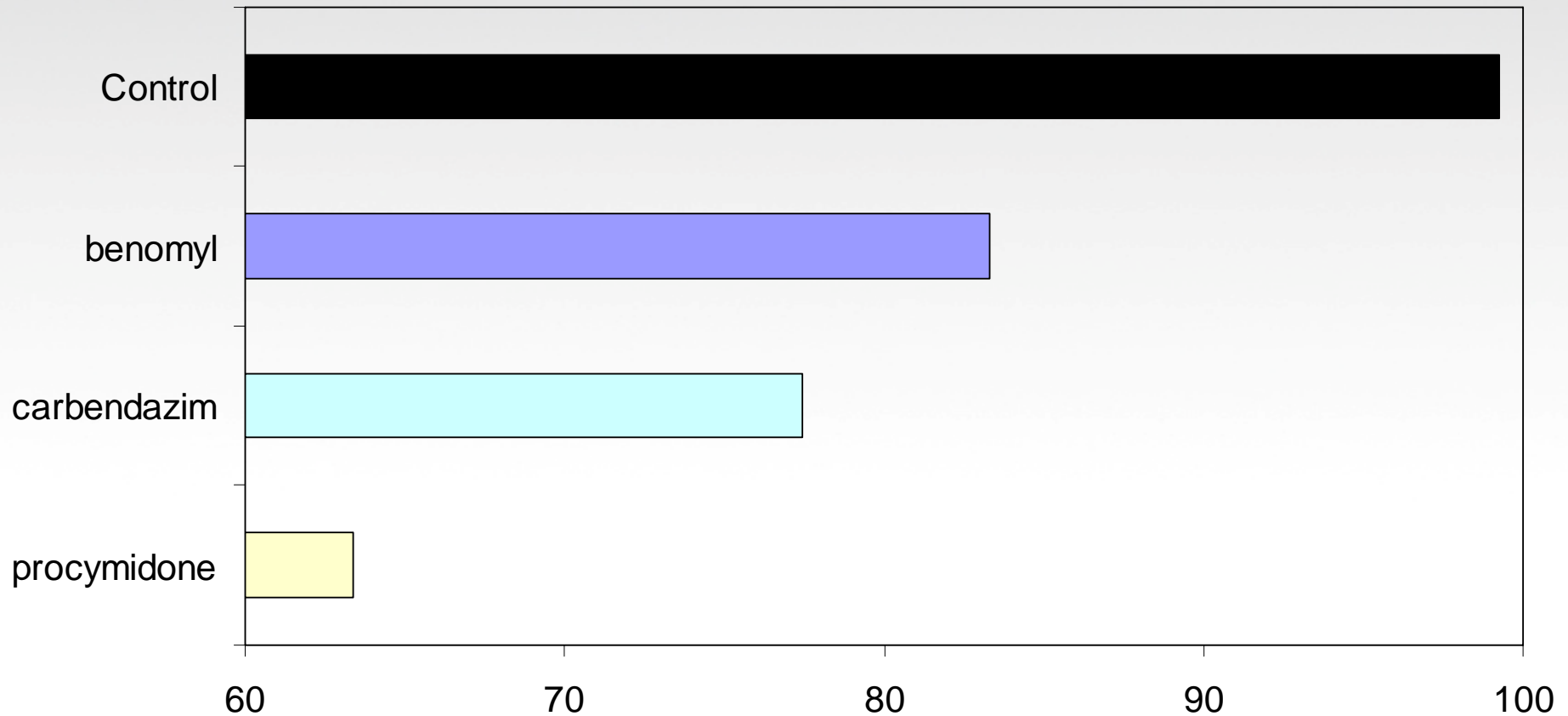
# Sclerotinia control during bean crops

- ✓ **Optimising Chemical control (1997-2000)**
  - Fungicide selection
  - Fungicide resistance
  - Application methods
  - Water volume ?
  - Surfactants / Stickers ?

# Fungicide efficacies under high disease pressure

1997 to 2000 - procymidone most effective fungicide

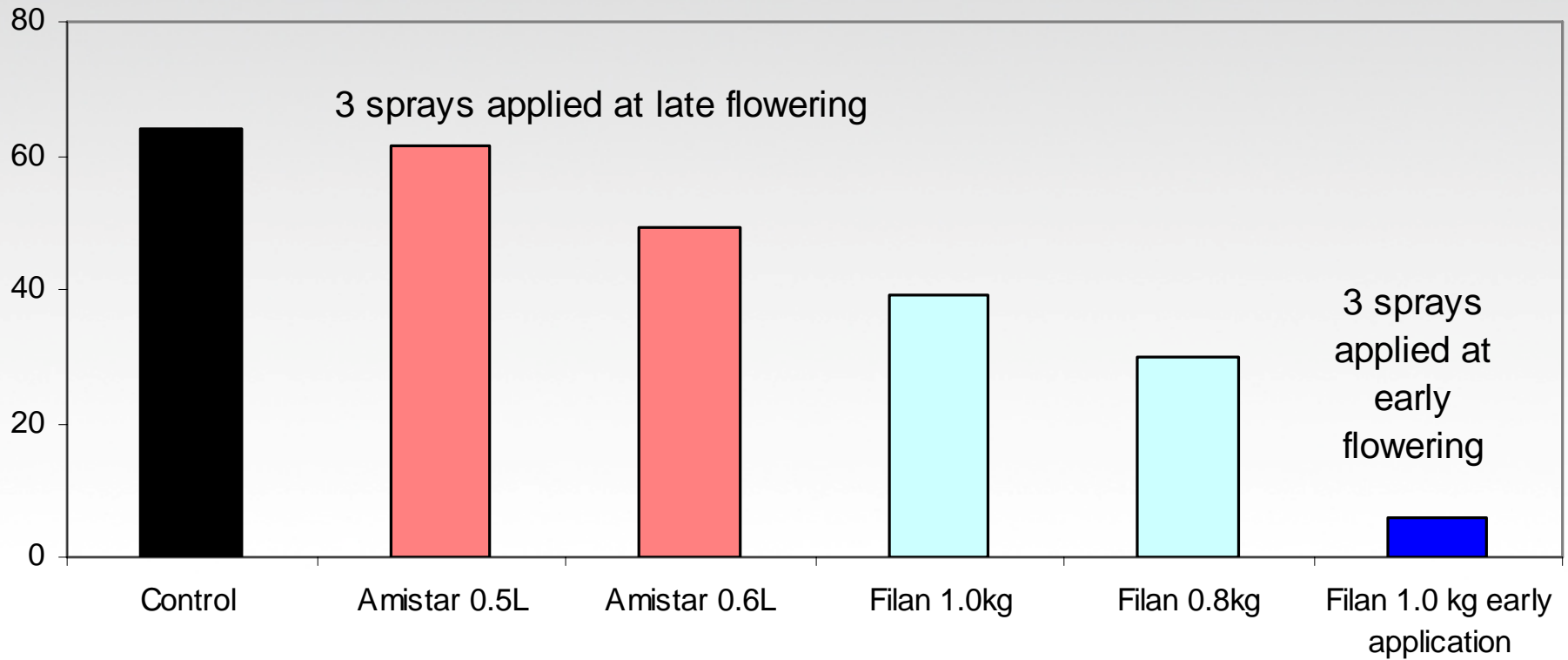
**% Diseased Plants**



# Timing of applications

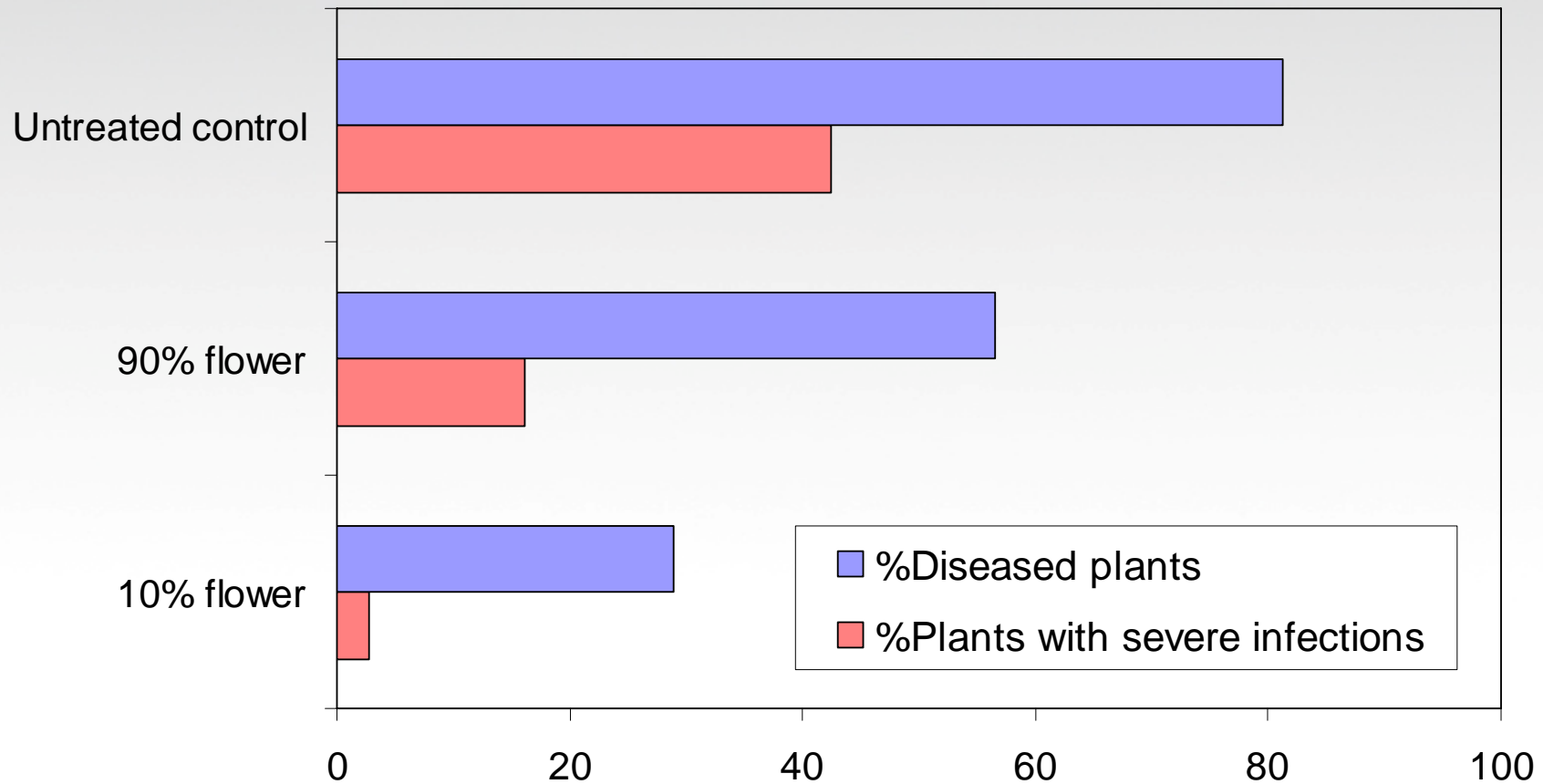
## Merseylea, Tasmania 2005

**% *Sclerotinia* infected plants**



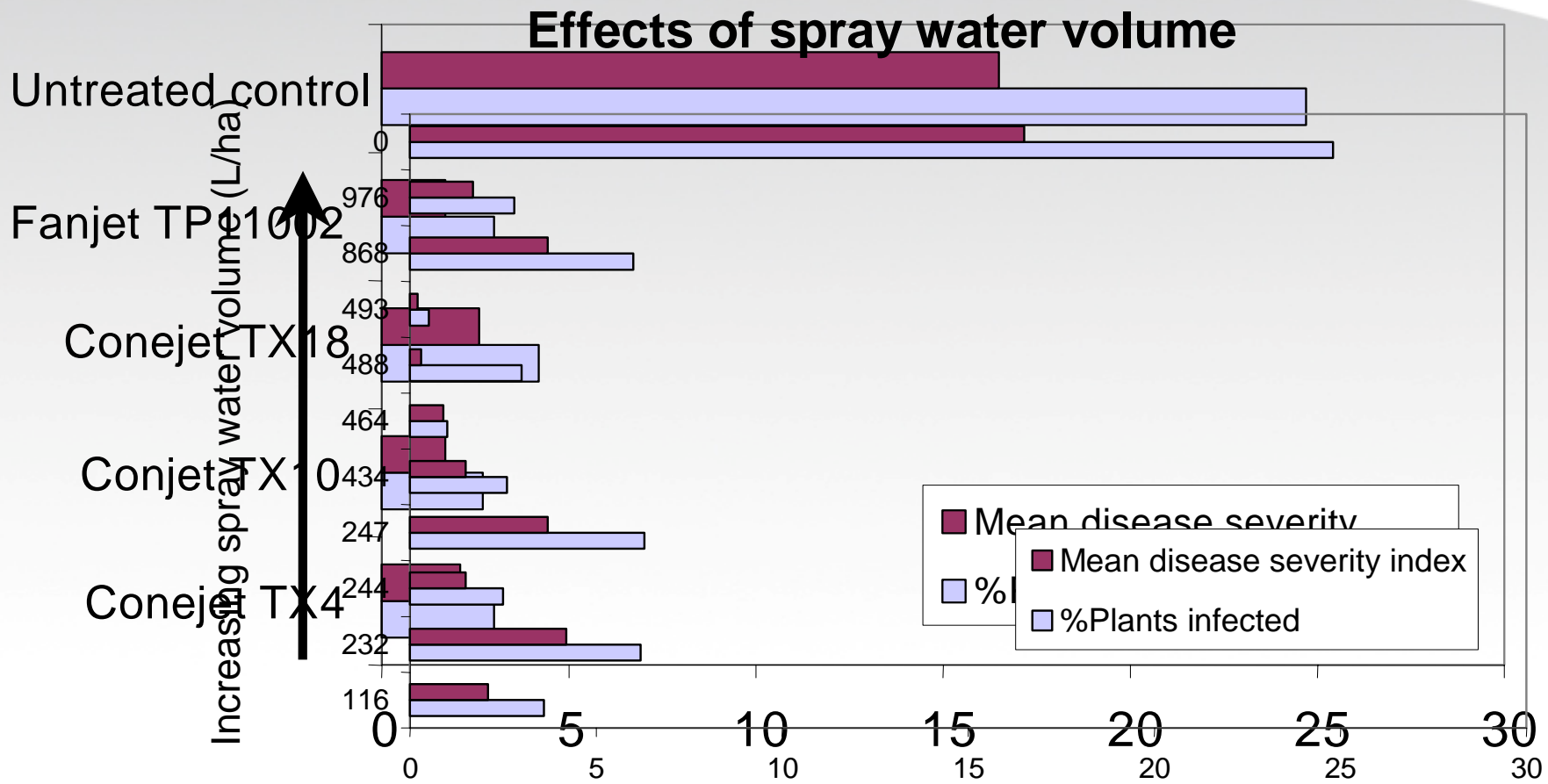
# Efficacy affected by the 1st Fungicide Application 1999

Flowering based on % plants with first flower



# Effects of spray nozzles & water volume 1998

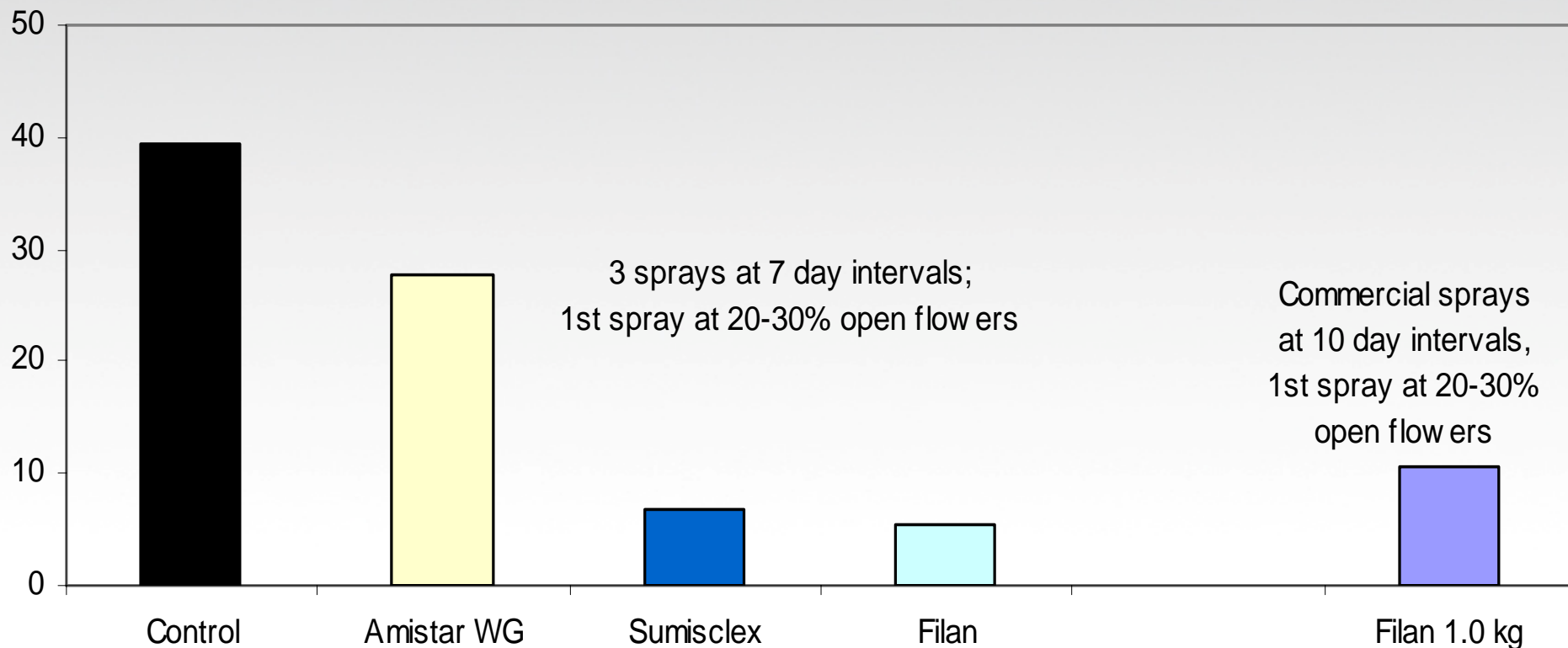
## Effects of spray nozzle type





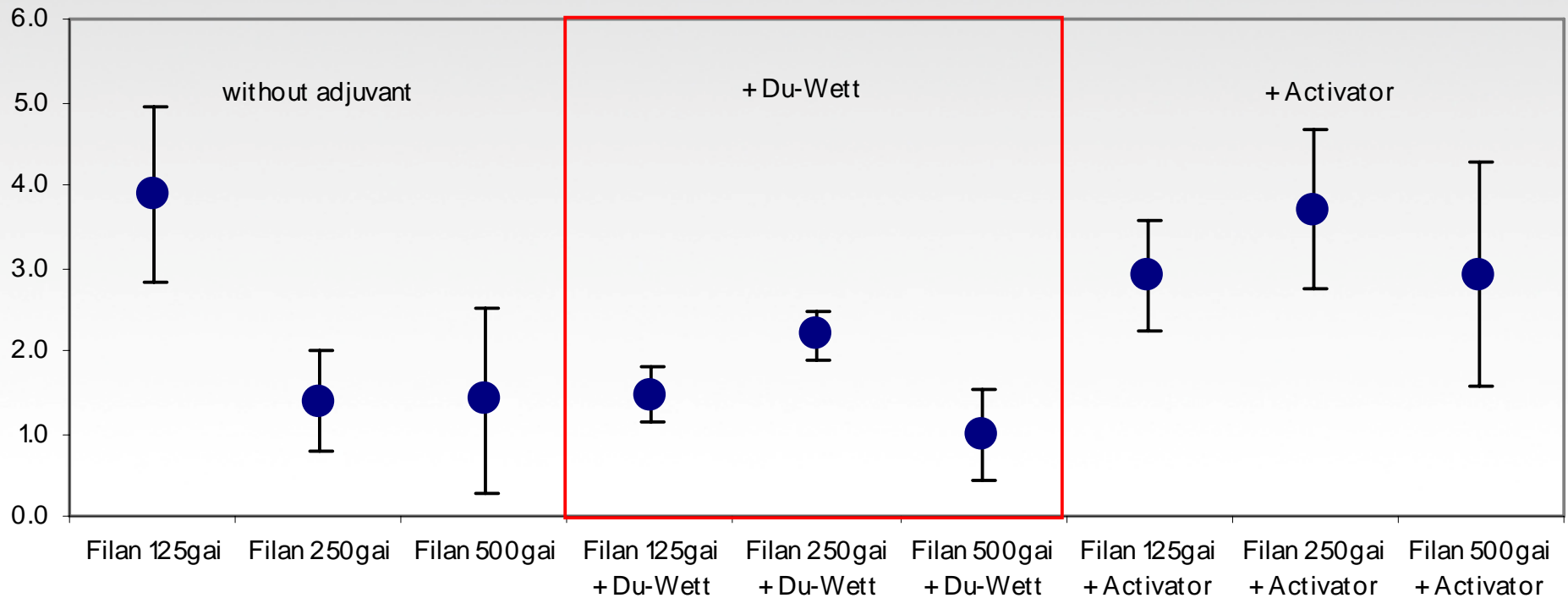
# Number of fungicide applications 2006

## % *Sclerotinia* infected bean plants



# Wetting agents – effects on coverage & performance 2007

## % Sclerotinia infected plants +/- SE



# Chemical control on beans – key findings

- No fungicide resistance
  - with procymidone, boscalid
- **Field conditions – reduce risk factors**
- Application methods
  - Types of fungicides
  - Timing of sprays
  - Number of sprays
  - Wetting agent
  - 250 to 300 L water /ha adequate

# Other strategies 2000-2004

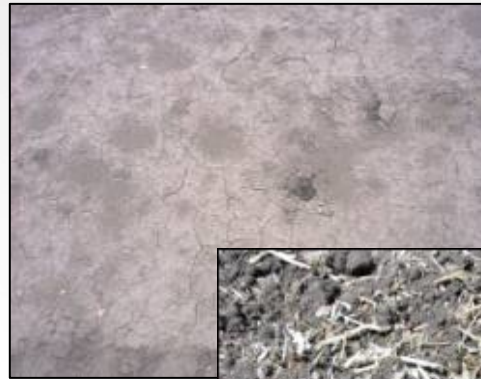
- Short term during crop period
  - Biocontrol agents
  - Other non-fungicides
- Long term between crops
  - Pre-plant treatments - reduce sclerotia in soil
  - Crop rotations, biofumigant crops - break disease cycle
  - Soil health - microbial diversity, soil structure

# Green manure crops

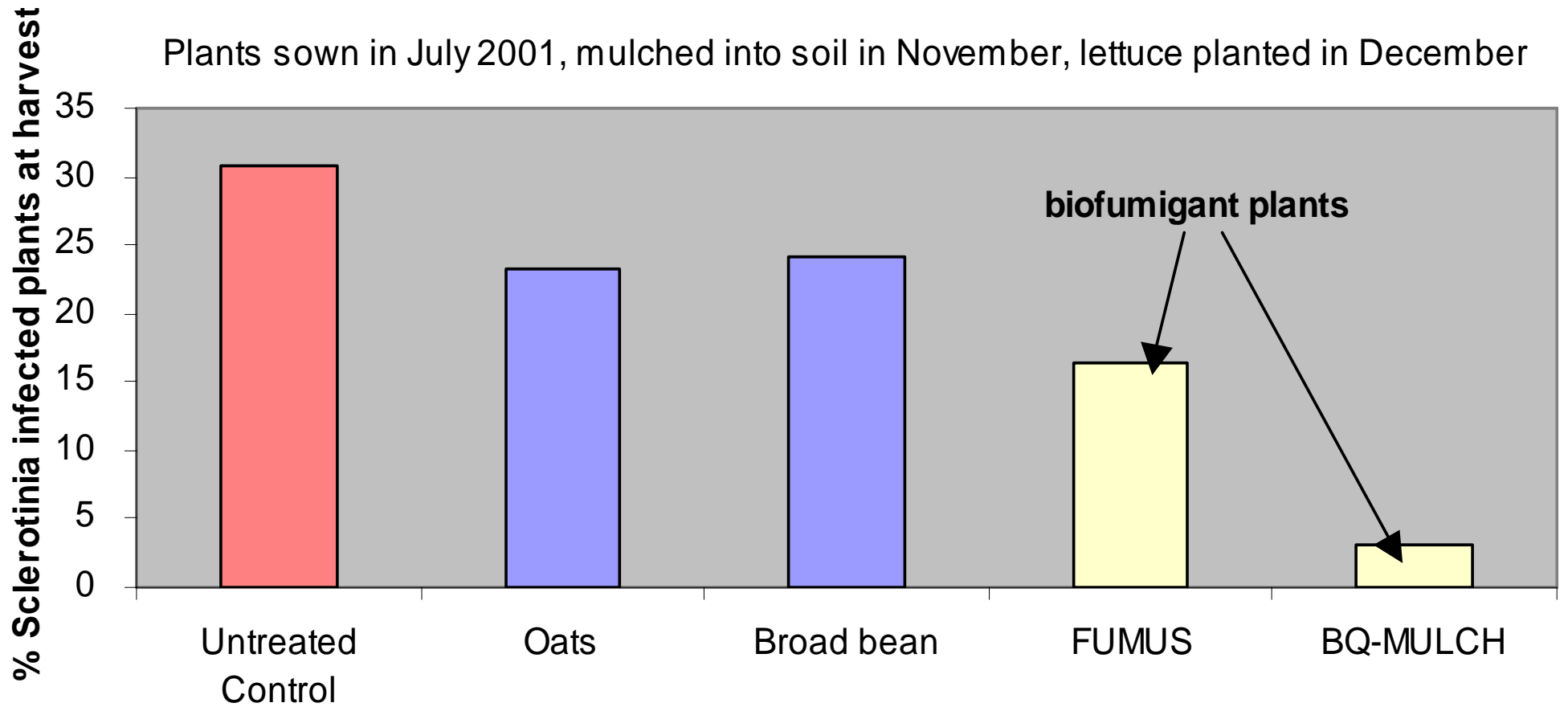


Break crop /  
biofumigation

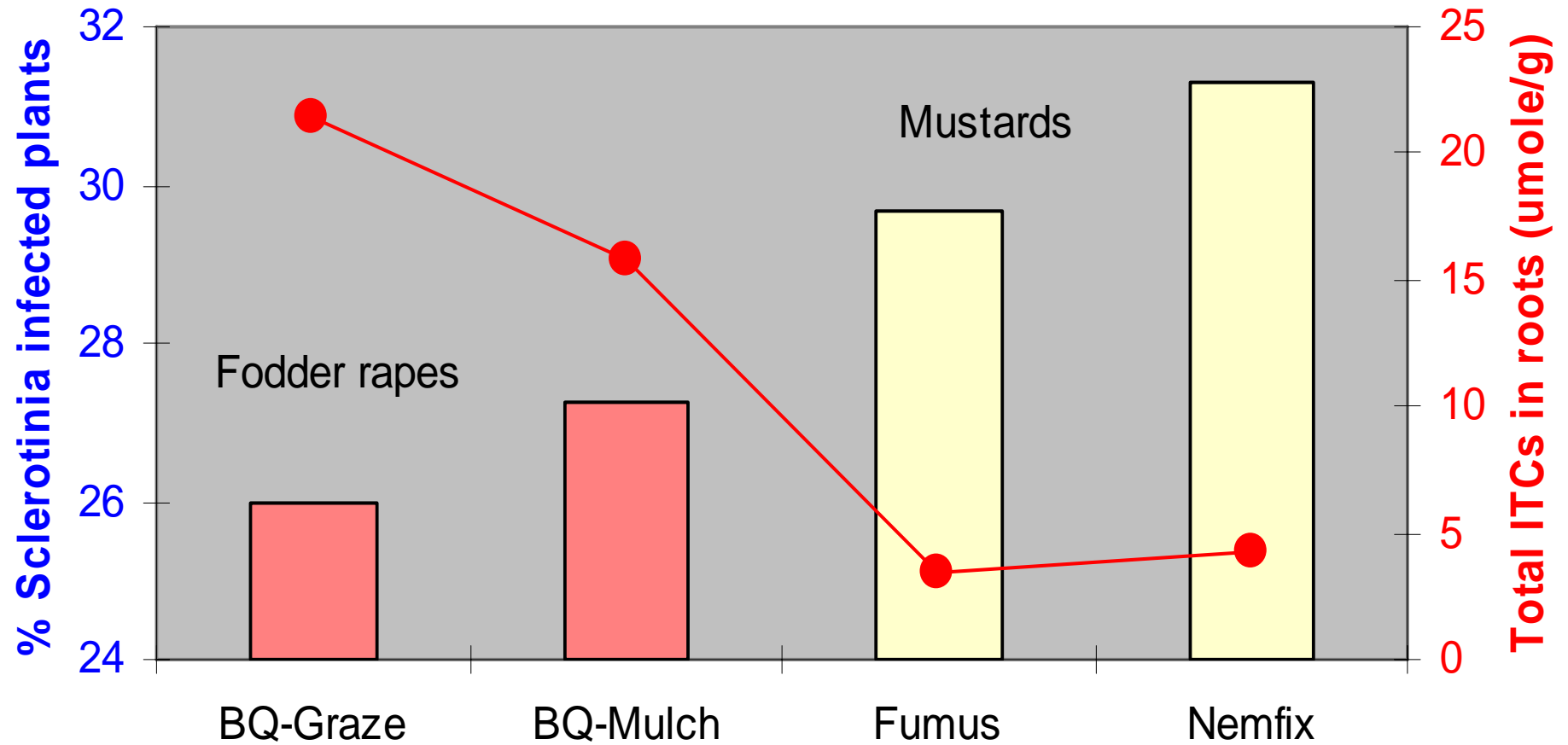
Organic matter  
Soil microbes  
Soil structure  
Soil nutrient



# Biofumigant crops - reduce *Sclerotinia* wilt (lettuce drop)



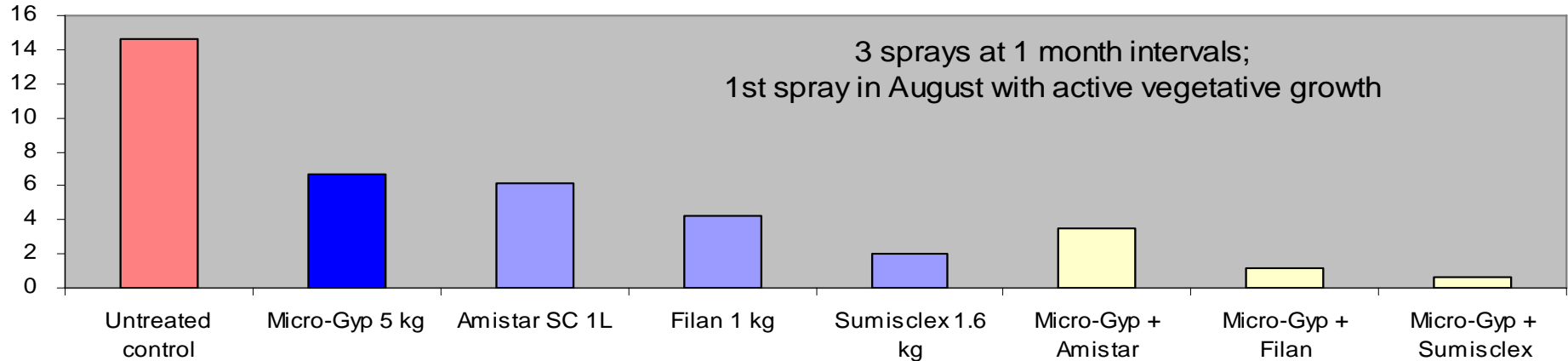
# Fodder rapes - more effective in suppressing *Sclerotinia minor*



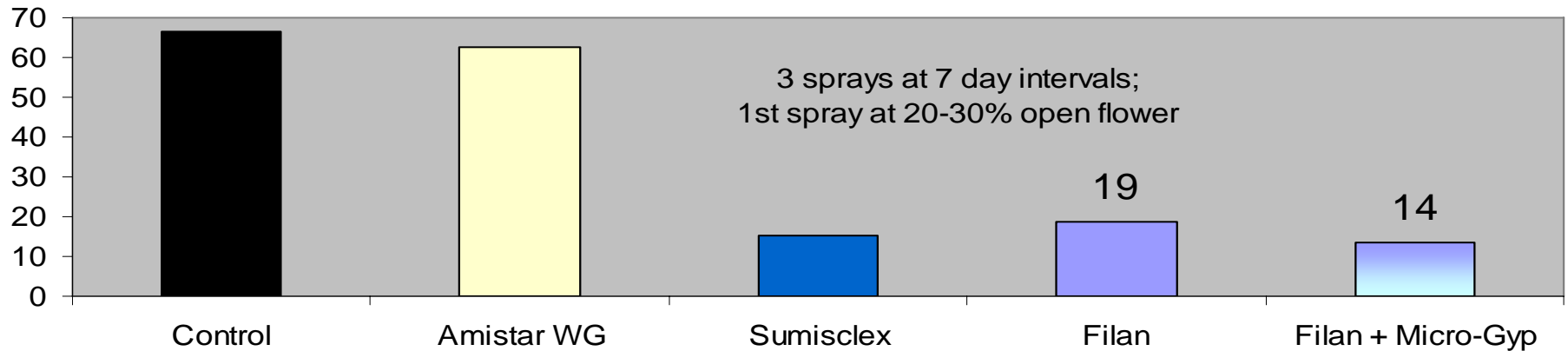
# Fungicide alternatives to procymidone (Sumisclex)

## % *Sclerotinia* infected plants

### *Sclerotinia minor* - Pyrethrum (December 2004)



### *Sclerotinia sclerotiorum* - Green bean (March 2005)



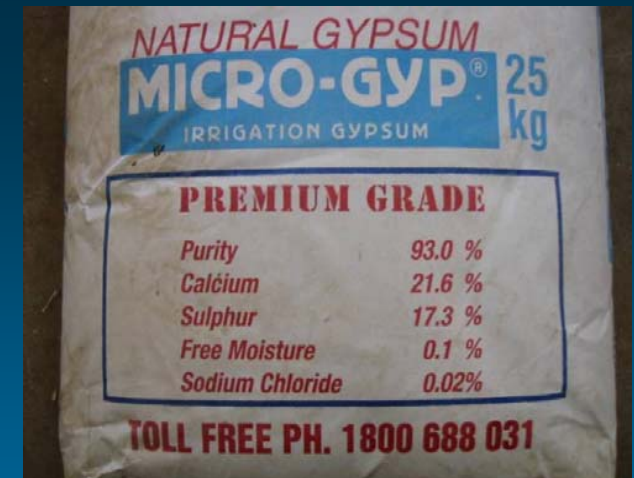


## Low cost products for improving disease control & yield

- Filan / Sumisclex plus (~ \$60 - \$100/ha )

- Agri-Fos (~ \$18 /ha)

- Micro-Gyp (~ \$1.50 /ha)

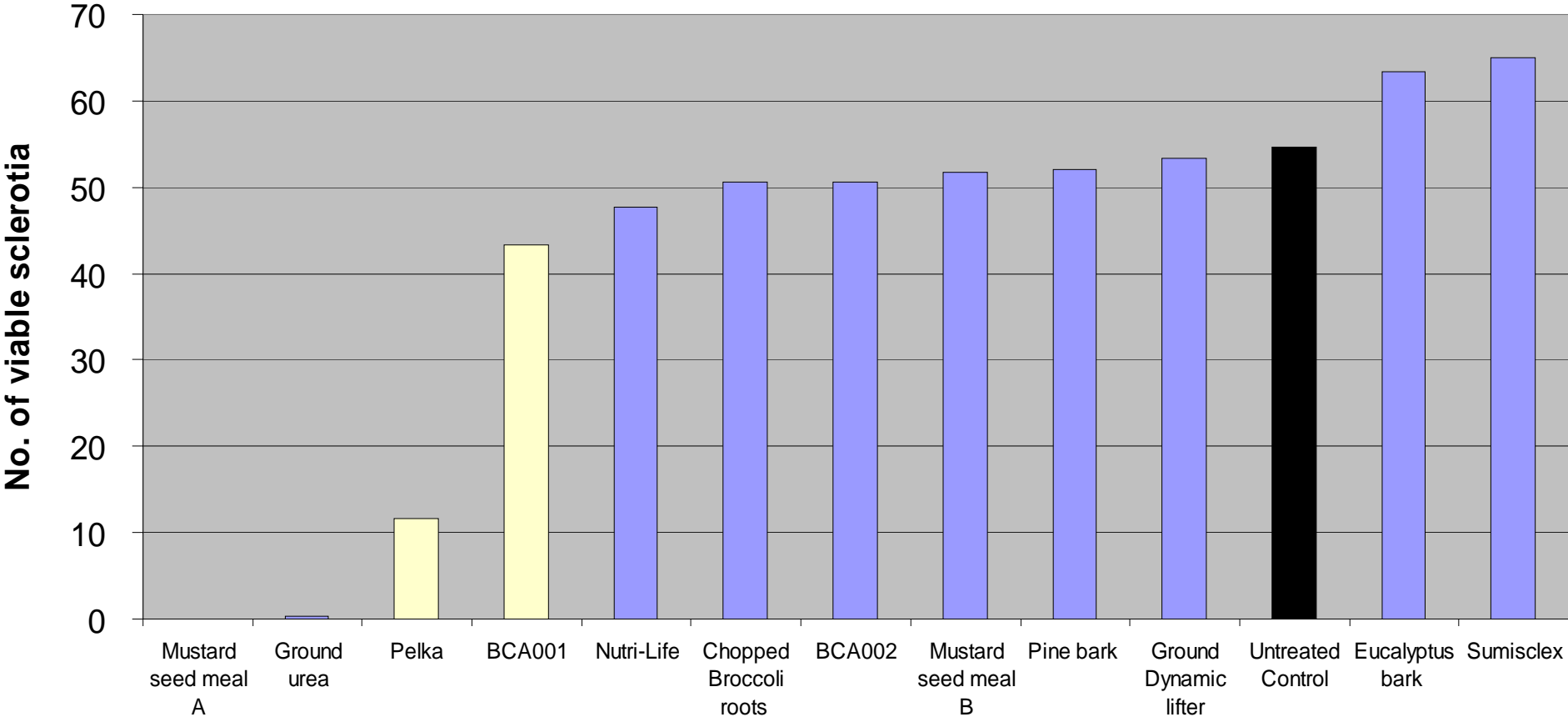


1% to 5% yield  
improvement for  
vegetables

# Soil amendments

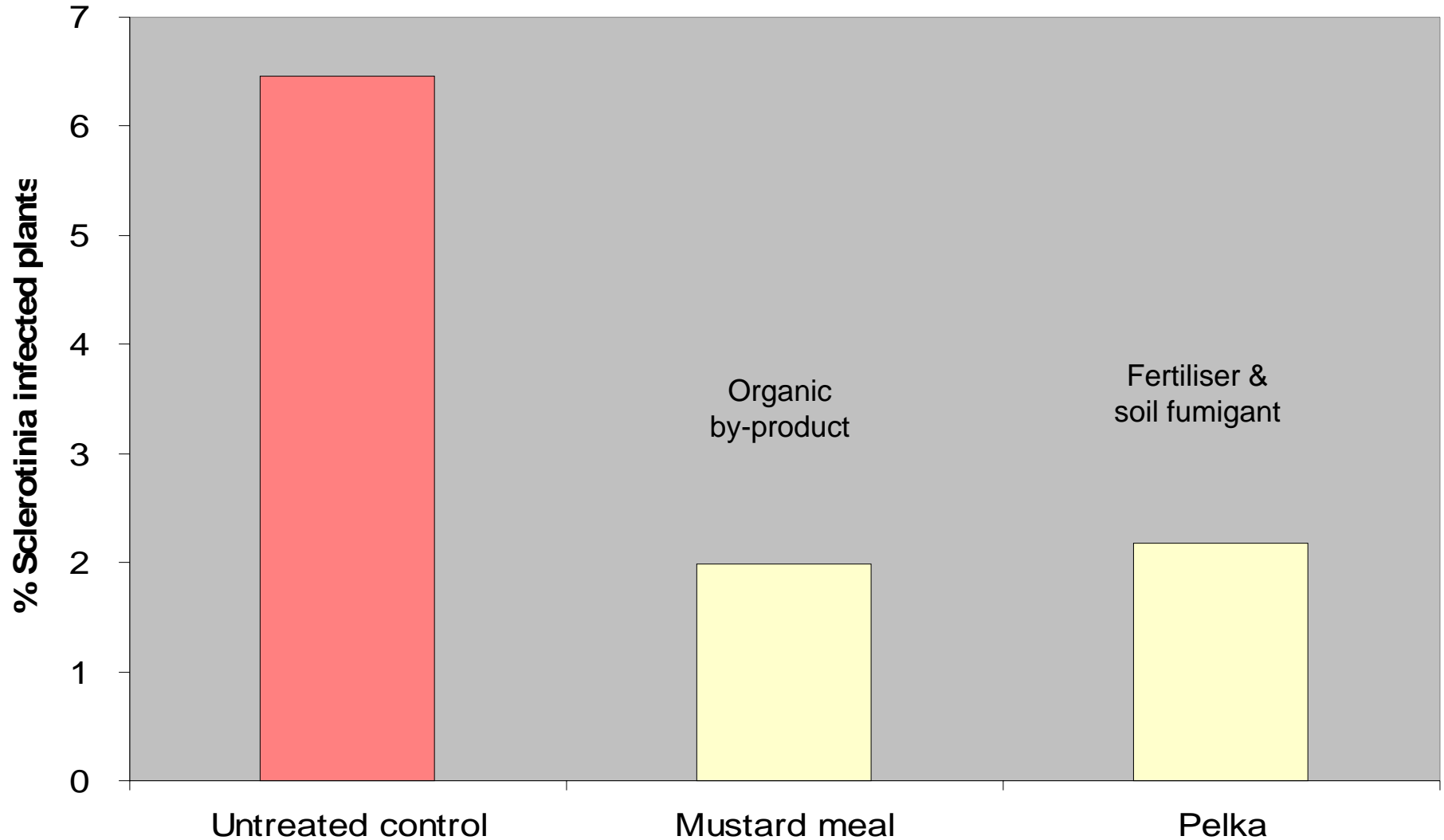


Effects of soil treatments on sclerotia viability - a lab study  
(15/11/01 ~ 22 weeks)



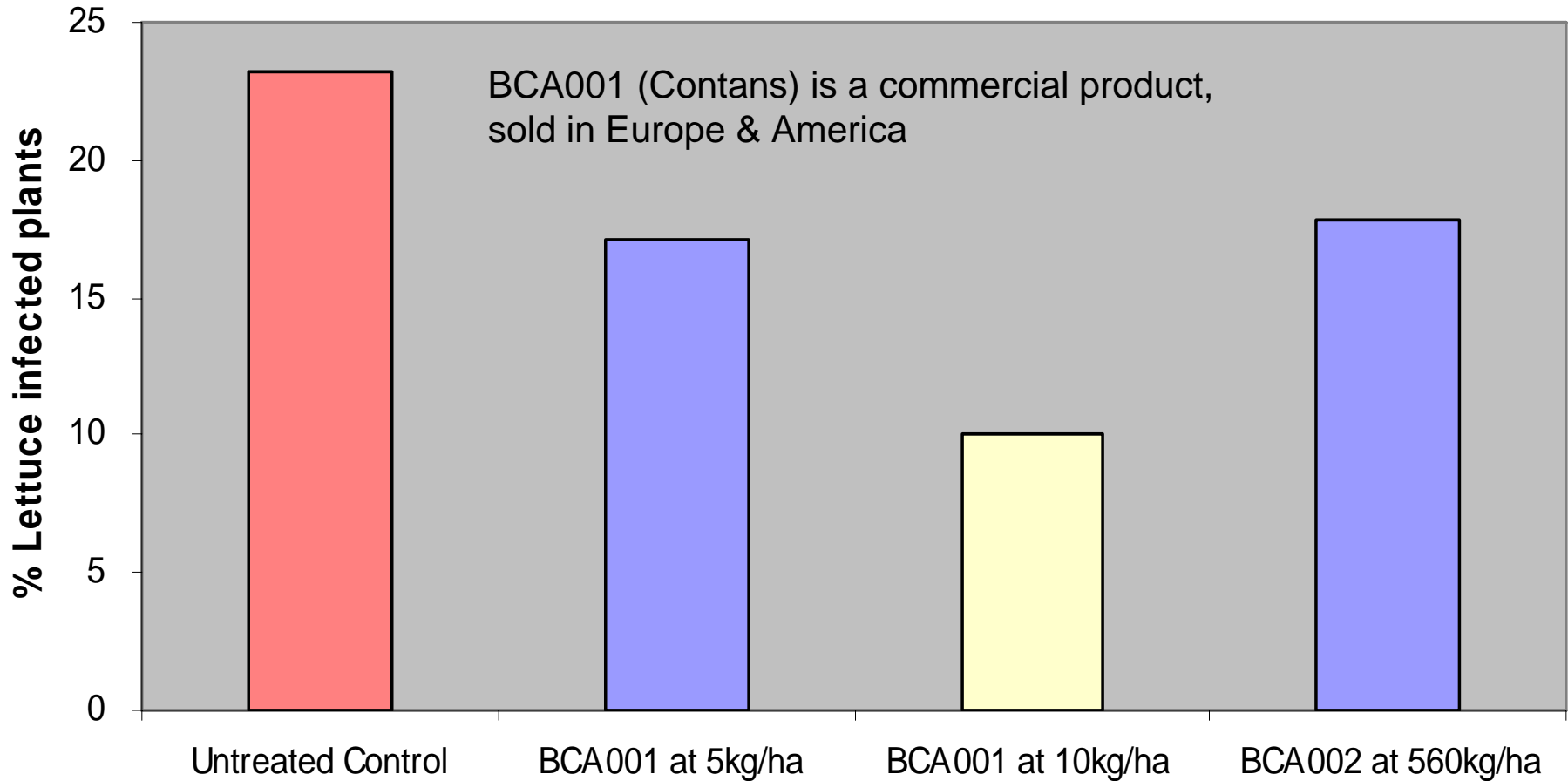
# Soil amendments

Field trial within a commercial iceberg lettuce crop at Cuprona, Tasmania



# ***Biocontrol agents - Coniothyrium minitans, a fungal parasite of Sclerotinia***

**Field trial within a commercial cos lettuce crop in Southern Tasmania**



# Non-chemical alternatives 2000-2005

- Will not replace chemical use
- Part of integrated management ?
- *S. sclerotiorum* vs *S. minor*
  
- Suppress/reduce pathogen in soil
  - Biocontrol agents ?
  - Brassica green manures
  - Crop rotations



# Adoption of R & D outcomes (2000-2007) for improvement in *Sclerotinia* control

- ✓ 1998 - water volume - 250 to 300 L/ha adequate
- ✓ 1999 - early 1st spray timing on bean flowers
- ✓ 2003 pyrethrum, 2004 beans - use of gypsum with fungicide
- ✓ until 2004 - procymidone
- ✓ 2004 - BQ-Mulch (biofumigant crop)
- ✓ 2004 - boscalid (Filan) - emergency permit use
- ✓ 2005 - irrigation management (by Serve-Ag)
- ✓ 2007/08 – boscalid – application for registration use
- ✓ 2007 - use of Du-Wett with boscalid
- ✓ 2006 - Gympie, Queensland (an exception)
  - Constant hot, humid, wet condition & susceptible cultivars
  - Procymidone gives better efficacy, but still have ~ 20-30% infected plants