

Biofumigant Crops for Soilborne Disease Management in Tasmania

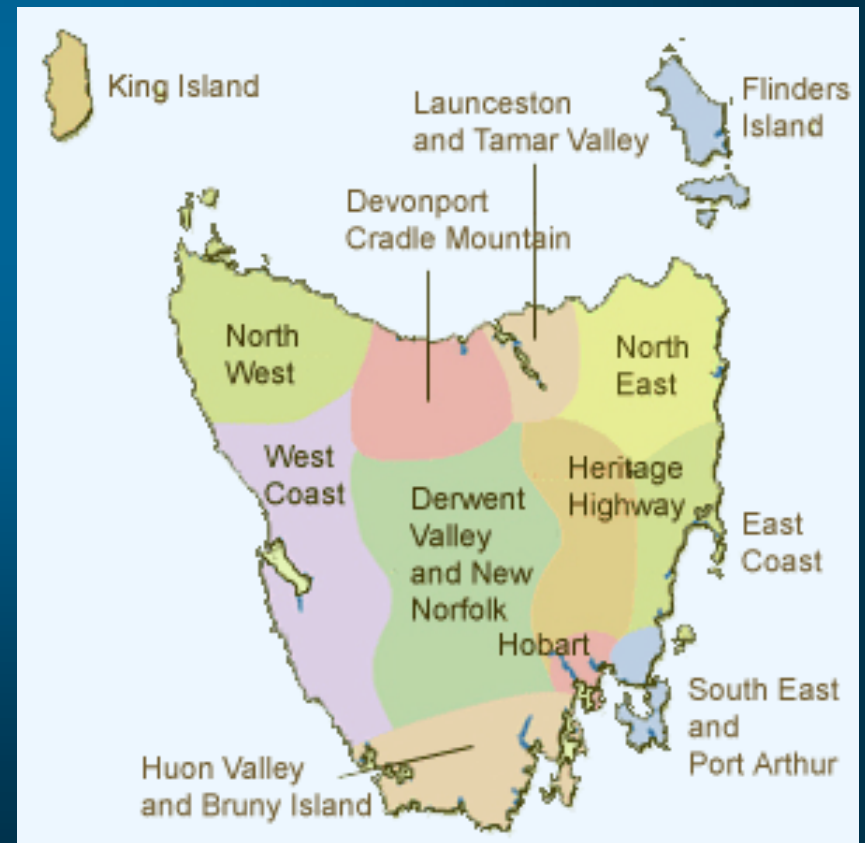


Dr. Hoong Pung
Peracto Pty Ltd



Know-how for Horticulture™

Tasmania



Major vegetable crops

Vegetables

~ \$200 million farm gate value

~ \$600 million net sales value

640 vegetable farms



Other major crops



Most crops typically sown in 3-4 year rotation with other vegetable and broadacre crops (include grains, pasture)



Forth Valley



Soilborne Diseases

Aphanomyces euteiches

Ascochyta spp.

Phytophthora spp.

Pythium spp.

Rhizoctonia solani

***Sclerotinia* spp. – white mould**

Sclerotium cepivorum – onion white rot

Streptomyces scabies – common scab

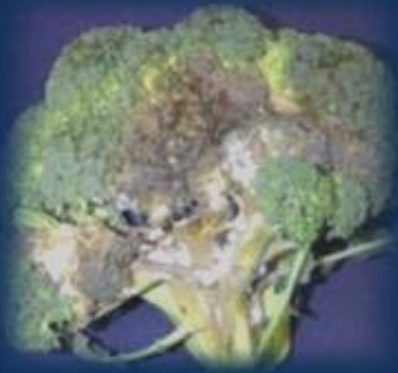
Spongospora subterranea – powdery scab

Thielaviopsis basicola – black root rot

Bacteria – *Erwinia* and *Pseudomonas*



Sclerotinia **wide** **host** **range**



Green manure crops



- Biofumigation ?
- Organic matter
- Beneficial soil microbes
- Soil improvement



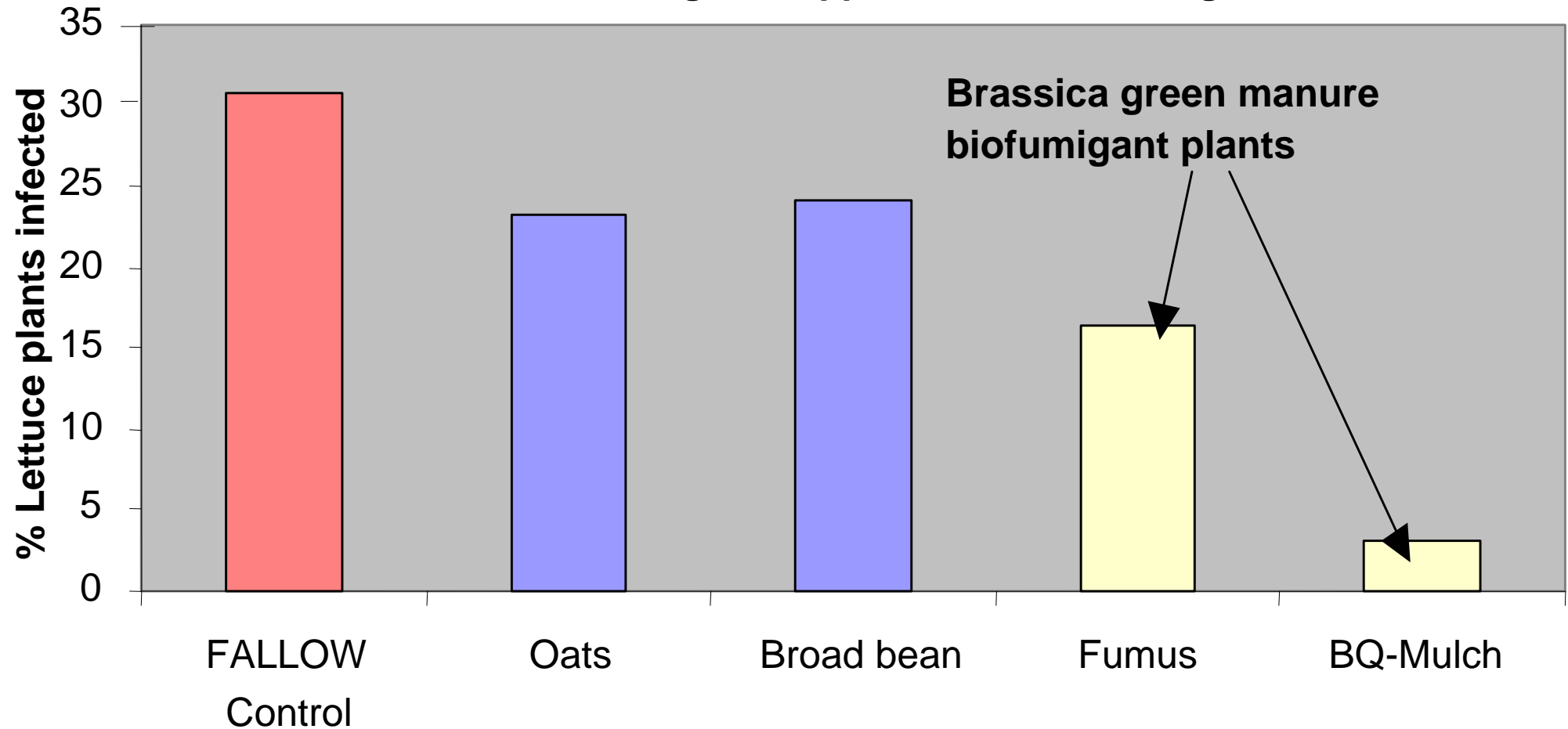
Potential of green manures

Field trial in Cambridge

Sclerotinia disease incidence

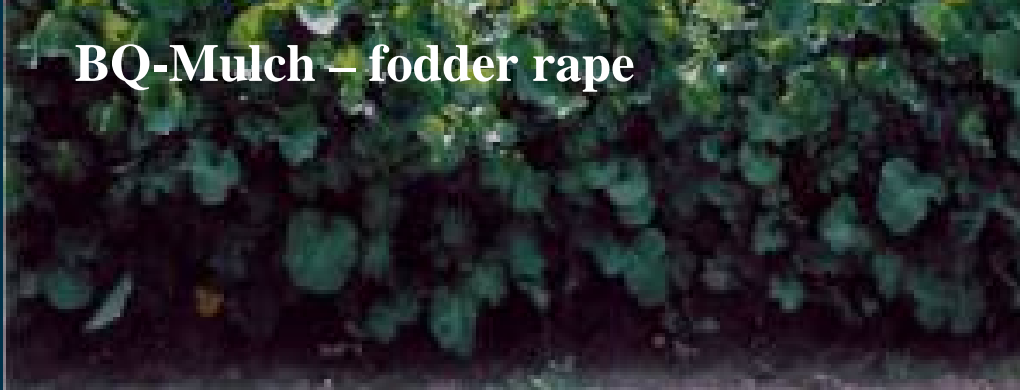
Sown in July, mulched in November,
lettuce planted in December

One Sumisclex fungicide application after sowing





FUMUS – mustard



BQ-Mulch – fodder rape

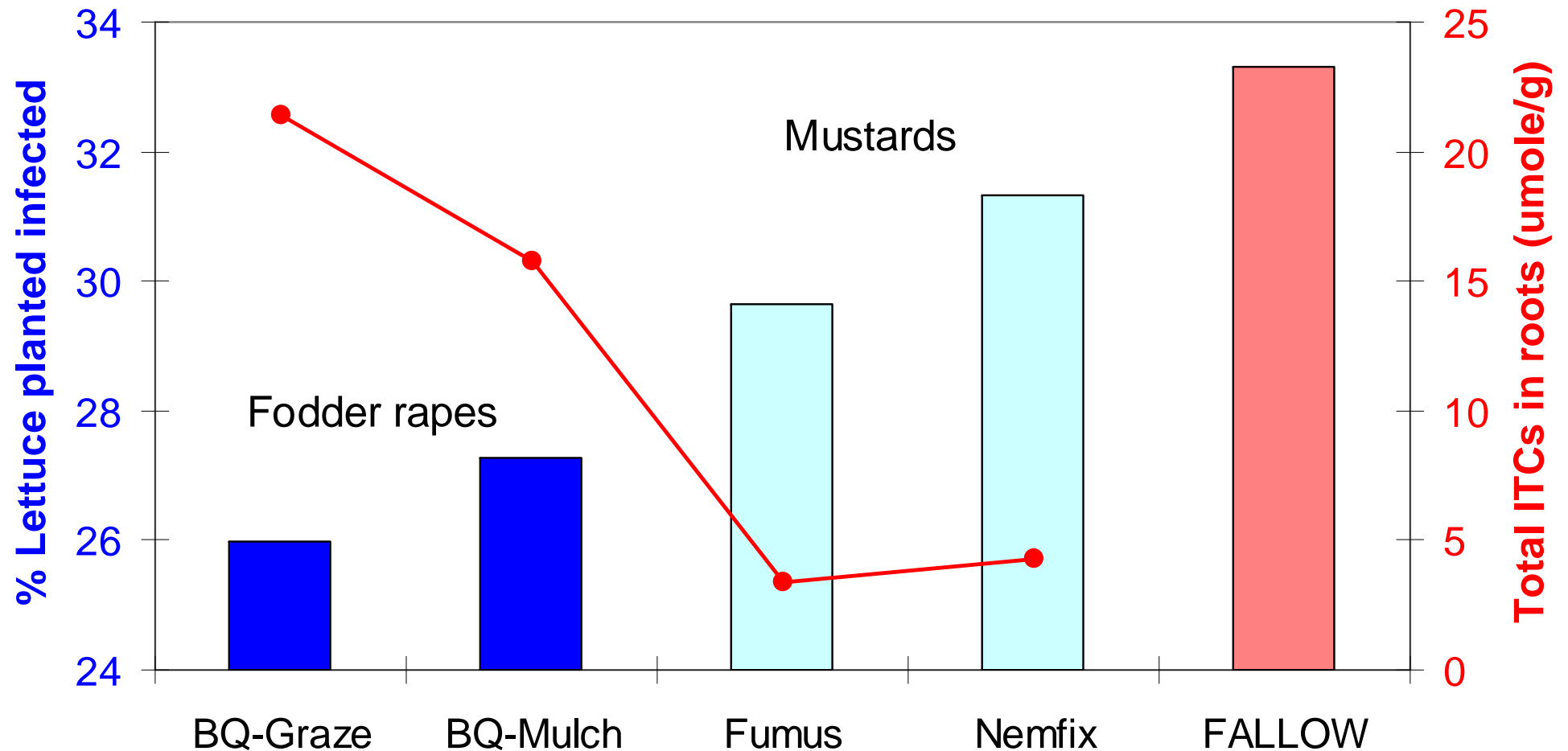
Lettuce crop
Control (fallow) BQ-Mulch



Fodder rapes - more effective in suppressing *Sclerotinia*

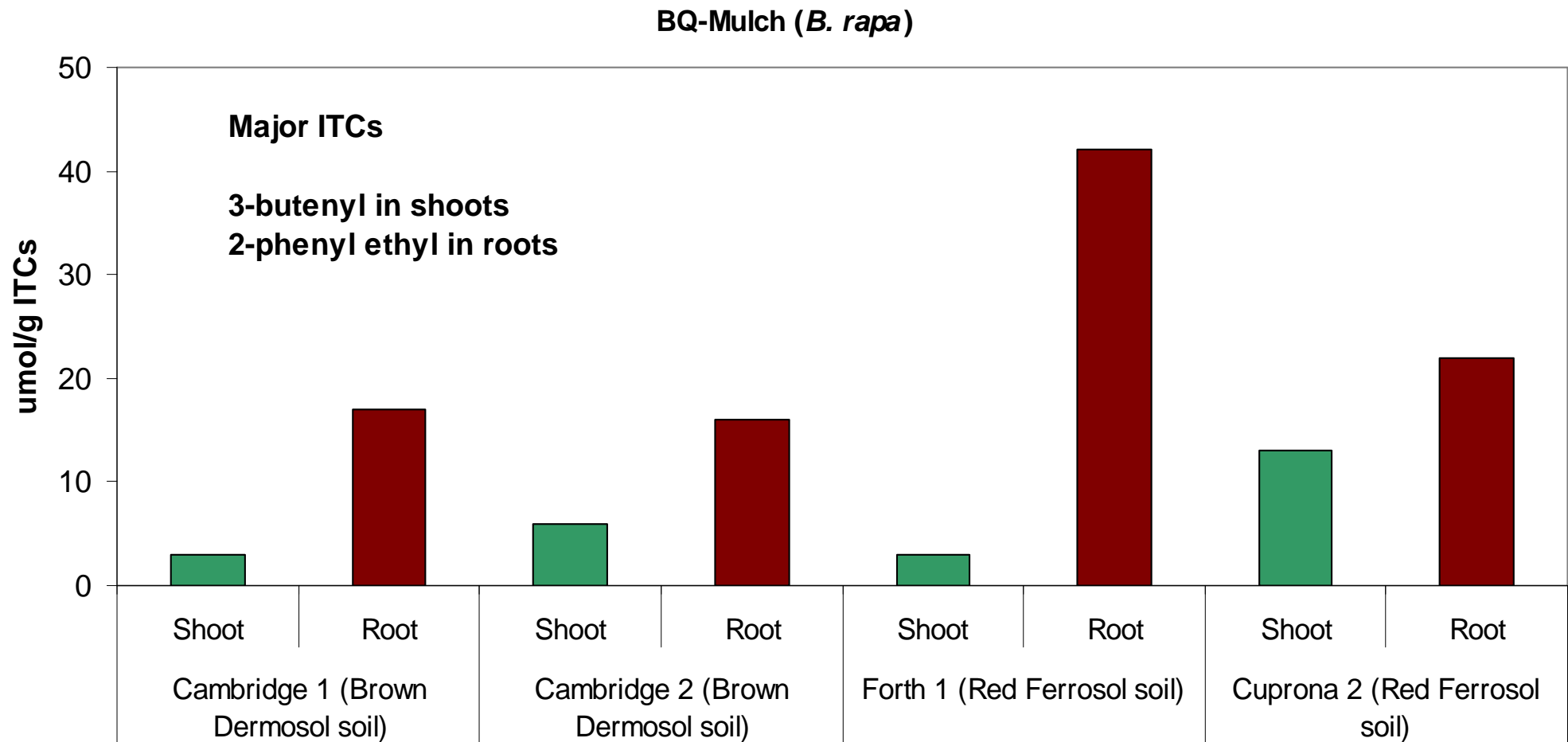
Field Trial in Cambridge, 2002-2003

No fungicide application during lettuce crop



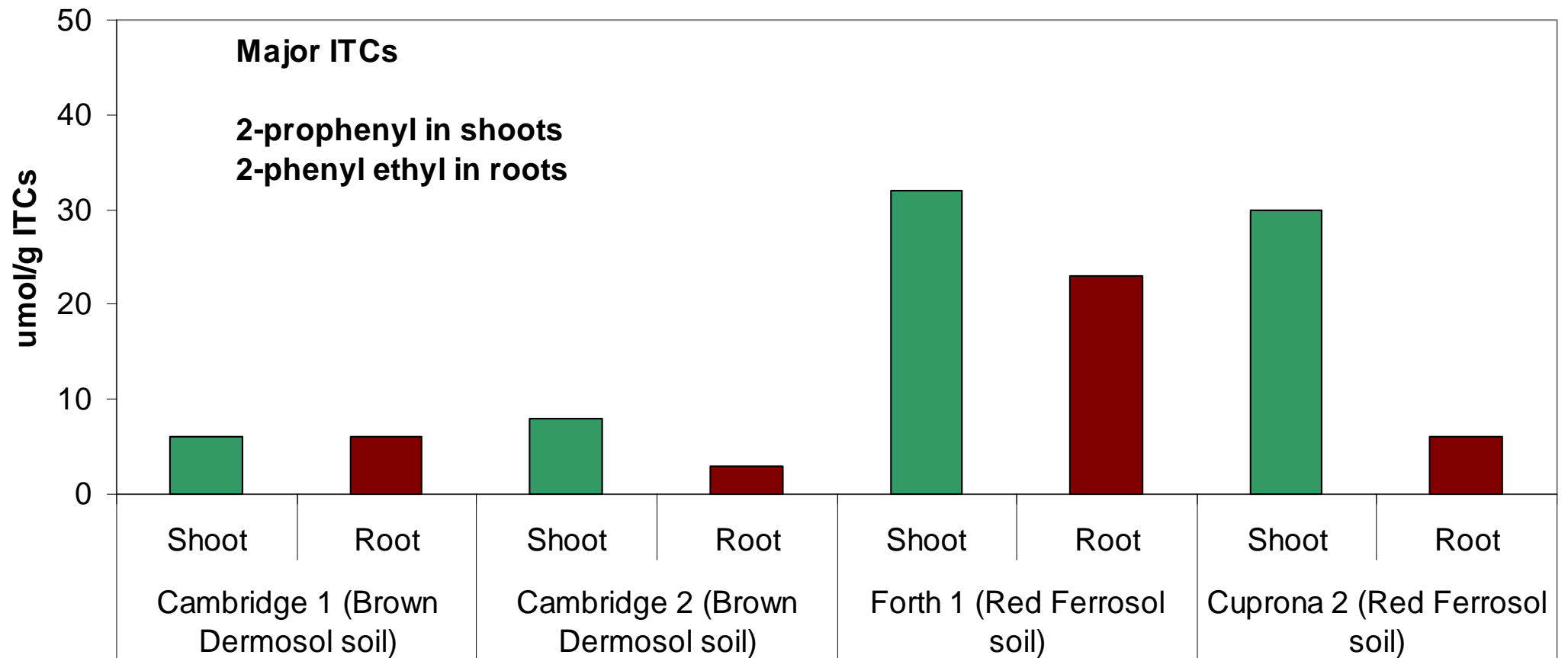
ITCs levels affected by soil type, location and agronomy

BQ-Mulch™ - Rape



FUMUS™ - Mustard

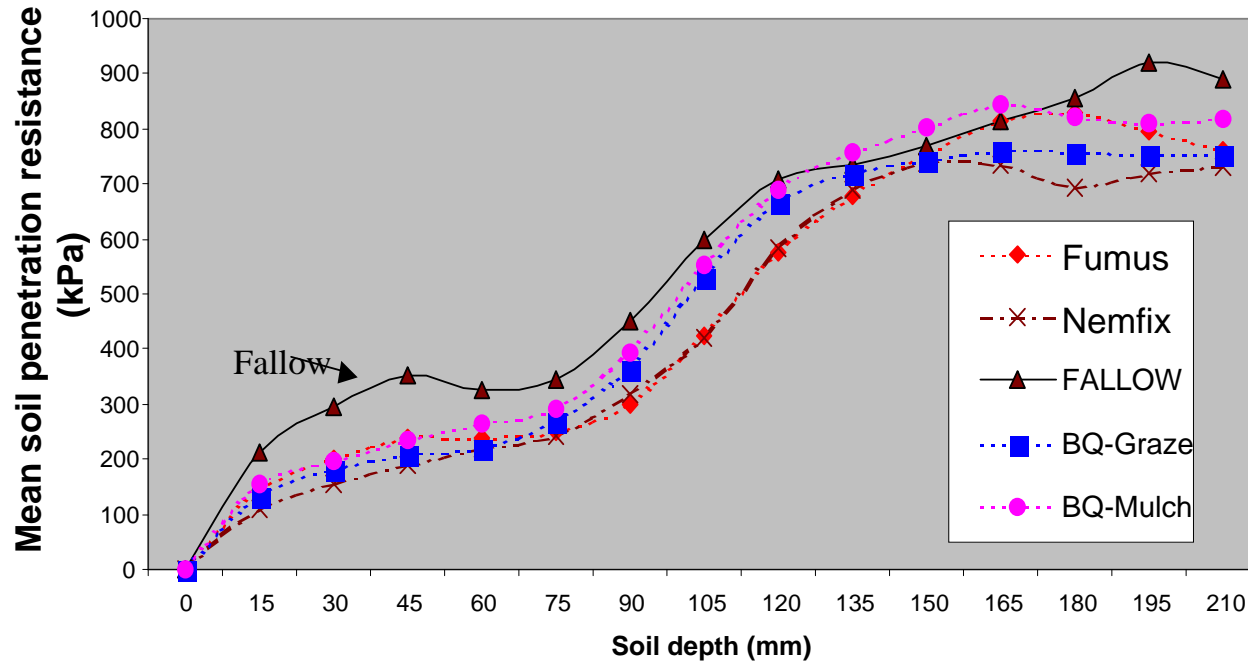
FUMUS (*B. juncea*)



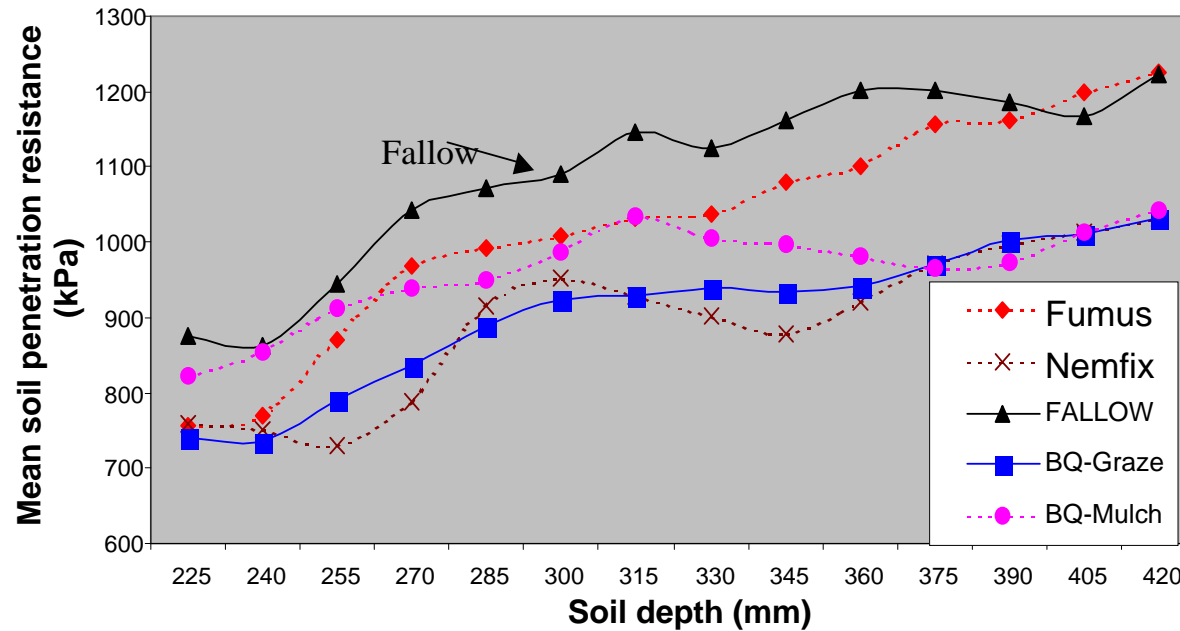
Deep tap root system + fibrous roots



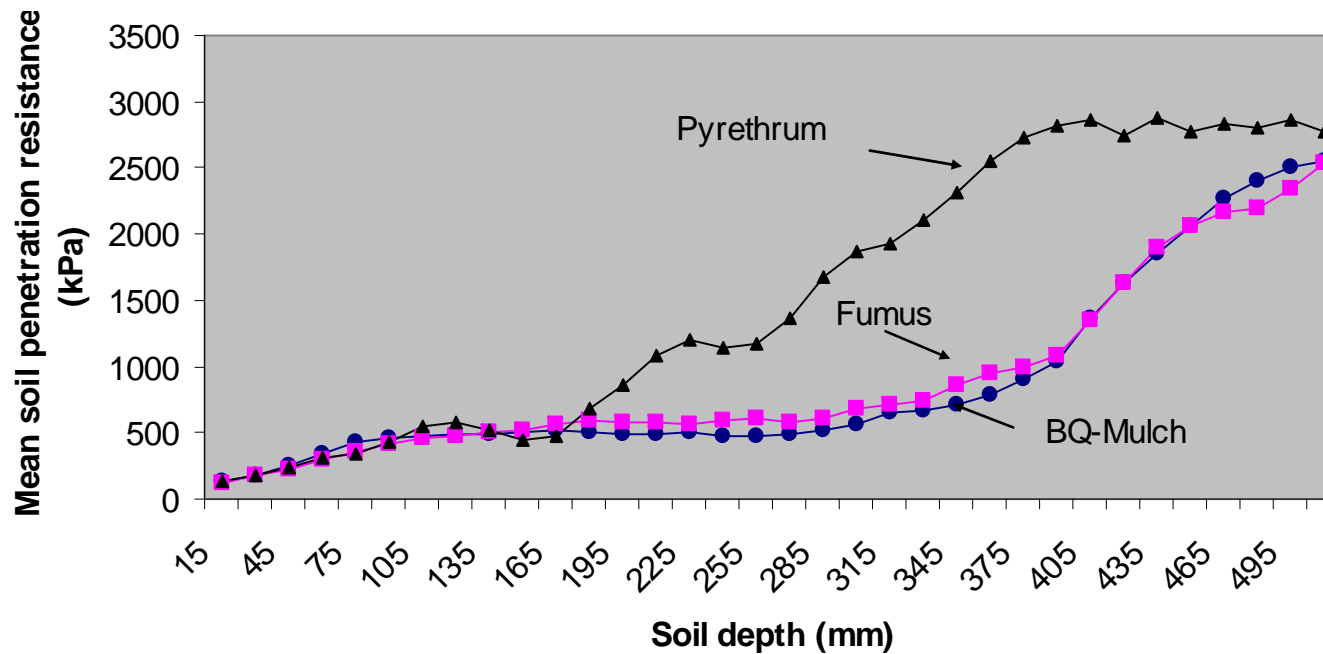
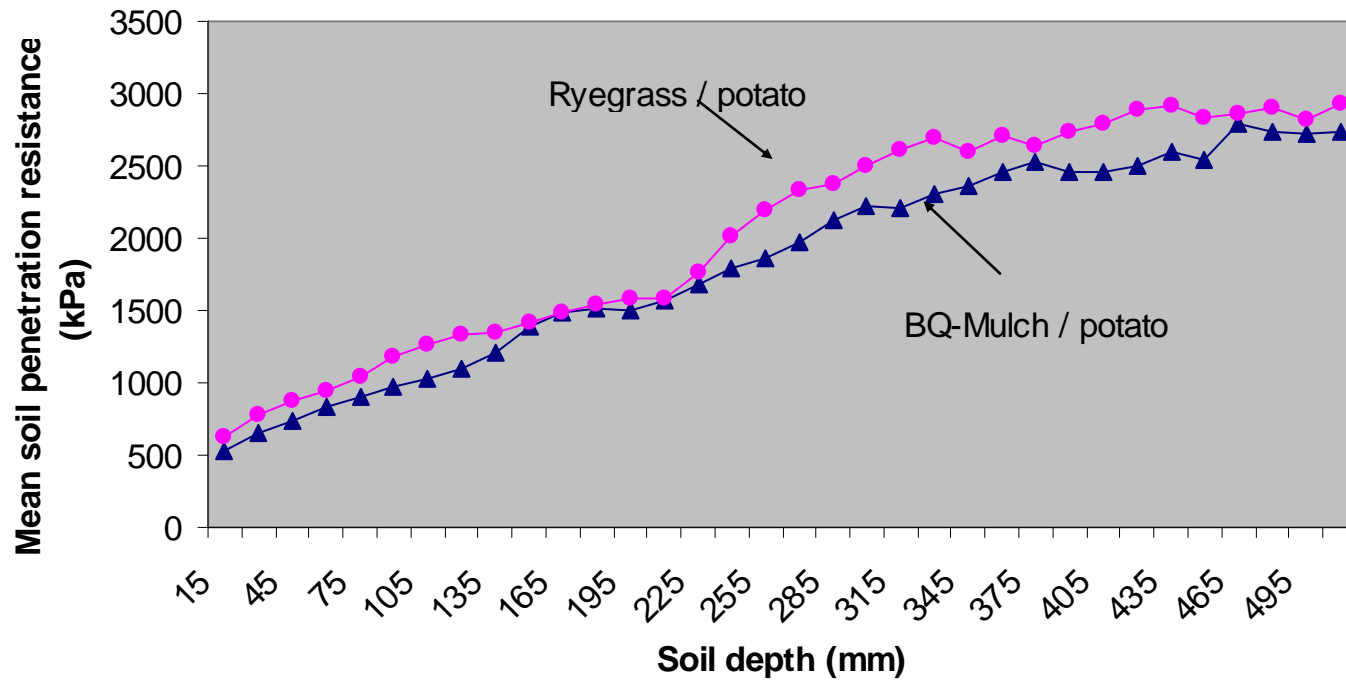
Cambridge - topsoil



Cambridge - subsoil

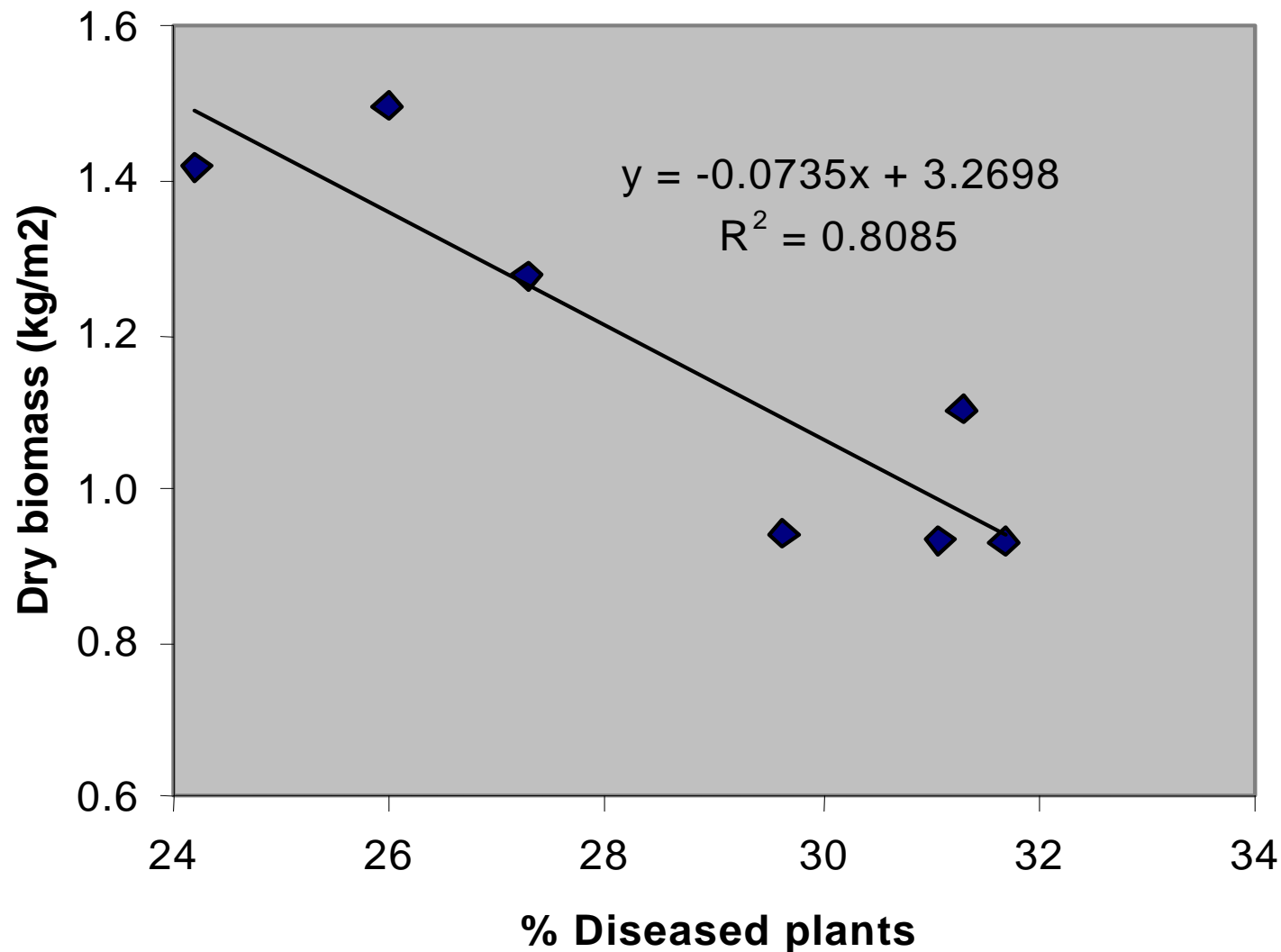


Demonstration blocks on farms



High plant biomass related to excellent root development

The relationship between biofumigant plant biomass levels and *Sclerotinia* incidence



Summary

- BQ-Mulch - better for *Sclerotinia* control
- Disease control related to root ITCs
- Biofumigation - short term disease suppression
- Longer term benefits - as a brassica green manure for overall soil improvements
- Optimise plant density, root and crop growth

Acknowledgement

- Susan Cross, Dennis Patten and Peter Aird
- Plant analysis for ITCs by Mark Shakelton at CSIRO Entomology, WA
- Research under projects funded by Australian vegetable growers and facilitated by Horticulture Australia Limited and AUSVEG



Know-how for Horticulture™

Table Cape



Sclerotinia disease



Sclerotinia minor

*Sclerotinia
sclerotiorum*

Both forms sclerotia for long term survival
Fungicides have no effect on sclerotia



Agronomy

- Optimising
 - Root development
 - Biofumigant production
 - Biomass production
- Integrated to farm systems
- ITCs release from roots vs shoots

