

# PROGRAM

---

**Monday 21 July – Welcome Reception & Registration****4.00 – 6.00 pm Welcome Reception and Registration (CSIRO Discovery Centre)**

An informal reception with light refreshments on Monday afternoon will allow travellers to arrive, register and settle into Canberra and to locate and familiarize themselves with the venue for the meeting.

**Tuesday 22 July**

8.00 – 9.00 am Registration (CSIRO Discovery Centre)

**Session 1. Plenary session (Chair Professor Matt Morra)**

- 9.00 – 9.15 Welcome and opening remarks  
*Dr John Kirkegaard, Chair Organising Committee*
- 9.15 – 9.55 Soil biofumigation – a strategy for the new world or a complexity too hard to get right?  
*Dr Ian Porter (Australia)*
- 9.55 – 10.30 Fate of glucosinolates and their hydrolysis products in soil  
*Dr Anne Louise Gimsing (Denmark)*
- 10.30 – 11.00 Coffee

**Session 2. Root glucosinolates and non-ITC effects of biofumigants (Chair Robin Harding)**

- 11.00 – 11.20 The distribution of glucosinolates and sulphur-rich cells in roots of field-grown canola (*Brassica napus*)  
*Margaret McCully (Australia)*
- 11.20 – 11.40 Myrosinase immobilized on Ca-polygalacturonate hydrogel: enzyme efficiency as a function of soil characteristics  
*Onofrio Leoni (Italy)*
- 11.40 – 12.00 Analysing disease progress curves to understand the effects of biofumigation on *Rhizoctonia* root rot of sugar beet  
*Natacha Motisi (France)*
- 12.00 – 12.20 Evaluation of *Brassica* accessions as potential biocidal green manure to control tomato bacterial wilt  
*Jaw-Fen Wang (Taiwan)*
- 12.20 – 12.35 Discussion
- 12.35 – 1.30 Lunch (Discovery Centre)

**Session 3. Seed meals, green manures and post harvest applications (Chair Luca Lazzeri)**

- 1.30 – 1.50 Ionic thiocyanates (SCN-) production, fate and phytotoxicity in soil amended with Brassicaceae seed meals  
*Matthew J Morra (USA)*
- 1.50 – 2.10 The effects of *Brassica* seed meal amendments on *Meloidogyne* hapla viability in laboratory bioassays  
*John M Halbrendt (USA)*
- 2.10 – 2.30 Understanding the mechanisms of plant pest suppression using *Brassica* green manures  
*John Kirkegaard (Australia)*

- 2.30 – 2.50 Five years of research to evaluate the potential utilisation of isothiocyanates to control postharvest fruits and vegetable losses by fungi infections in Mexico  
*Martin-Ernesto Tiznado-hernandez (Mexico)*
- 2.50 – 3.05 Discussion
- 3.05 – 3.30 Coffee

#### **Session 4. Beyond biofumigants (Chair Scott Mattner)**

- 3.30 – 4.00 Biorefinery - Brassicaceae plants as more than biofumigants!  
*Luca Lazzeri (Italy)*
- 4.00 – 4.30 Discovery and development of *Muscodor* species for mycofumigation  
*Gary Strobel (USA)*
- 4.30 – 4.45 Discussion
- 4.45 – 6.30 Poster Session 1 (with drinks, nibbles) – All posters on display

#### **Free evening for Symposium delegates**

#### **Sponsor and Committee Dinner, University House**

### Wednesday 23 July – Industry Forum Day

A focus on application and adoption of biofumigation including product development and demonstrations and grower experiences in utilizing biofumigants

- 8.00 – 9.00 Registration for Industry Forum Day

#### **Session 5. Applying biofumigation for disease control worldwide (Chair Brad Wells, HAL)**

- 9.00 – 9.20 Development of biofumigation as a non-chemical control method against plant parasitic nematodes and soil-borne diseases in temperate climates  
*Michalela Schlathölter (Germany)*
- 9.20 – 9.40 Green manure and biofumigation for root lesion nematode and verticillium wilt management in strawberry production  
*Guy Belair (Canada)*
- 9.40 – 10.00 The use of biofumigant green manure crops for soil-borne disease management in Tasmania, Australia  
*Hoong Pung (Australia)*
- 10.00 – 10.20 Innovative approach for producing high value products in non food agro-industrial chains  
*Giampiero Patalano (Italy)*
- 10.30 -11.00 Coffee

#### **Session 6. Industry and grower experiences 1 (Chair Les Baxter, ACIAR)**

- 11.00 – 11.20 Development and utilisation of mustard cover crops in the USA  
*Dale Gies (USA)*
- 11.20-11.40 Specialised Australian cover crops – the Seedco Experience  
*Bryan Robertson (Australia)*

#### **Farmer experiences**

- 11.40 – 12.00 *Keith Taylor (Western Australia)* (assisted by J Matthiessen)
- 12.00 – 12.20 *Darren Long/Peter Aird (Tasmania)* (assisted by H Pung)
- 12.20 – 12.40 *Tim Widdison (South Australia)* (assisted by R Harding)
- 12.40 – 1.00 *George Weda/Darren Schreurs (Victoria)* (assisted by I Porter)

## PROGRAM

---

- 1.00 – 1.30 Lunch on bus en route to CSIRO Ginninderra Experiment Station
- 1.30 – 3.00 Visit to CSIRO Farm to view field plots, discuss biofumigant products and incorporation techniques. Discuss of field applications and farmer experiences.  
*[Speakers re varieties on view – Dale Gies, Michaela Schlathoelter, Luca Lazzeri, David Jacobs, Bryan Robertson, John Kirkegaard, Stuart Gowers]*  
[Afternoon tea at farm]

### **Session 7. Utilising Brassicas and other green manures (Chair John Matthiessen)**

- 3.30 – 3.50 Utilising green manures in irrigated agriculture – brassicas vs other options  
*David Nehl (Australia)*
- 3.50 – 4.10 Soil biodisinfection for the management of soil-borne pathogens and weeds  
*Antonio Bello (Spain)*
- 4.10 – 4.30 Farmers' experiences of biofumigation for bacterial wilt management in solanaceous crops in the Philippines  
*Valeriana Justo (Philippines)*
- 4.30 – 5.30 Discussion Forum – Questions and Answers with expert panel  
*Moderator - Dr Ian Porter*
- 5.30 – 6.30 Optional poster viewing for day Registrants
- 6.30 – 7.15 Koomurri – Aboriginal Dance Performance (Discovery Lecture Theatre)

### **7.30 pm Conference Dinner (CSIRO Discovery Centre)**

## Thursday 24 July

### **Session 8. Integrating biofumigants for disease control and other benefits (Chair Jaw-Fen Wang)**

- 9.00 – 9.20 Strategies for enhancing brassicas multipurpose attributes in managing nematode parasitism complexes  
*Haddish Melakeberhan (USA)*
- 9.20 – 9.40 Biofumigation and management of soil-borne organisms in sandy soil crops in Almeria (Spain)  
*Miguel A. Diez-Rojo (Spain)*
- 9.40 – 10.00 Evaluation of biofumigation crops in the control of *P. penetrans* and *V. dahliae*  
*Gerard Korthals (Netherlands)*
- 10.00 – 10.20 The use of by-products from the wine industry in the control of plant parasitic nematodes  
*J.A. Lopez-Perez (Spain)*
- 10.20 – 10.40 Alterbromide, a European programme for the dissemination of alternatives to methyl bromide  
*Gael du Fretay (France)*
- 10.40 – 11.00 Discussion
- 11.00 – 11.30 Coffee

### **Session 9. General Discussion and awards**

- 11.30 – 12.30 General Discussion, Poster competition award announcement and closing Remarks
- 12.30 – 1.30 Lunch and removal of Posters
- 1.30 – 2.30 *Committee meeting re Conference Proceedings*

### **Free afternoon for group meetings/Canberra sightseeing or travel**

## Friday 25th July – Optional Field Tour

An optional one day field tour will be organised by John Kirkegaard to the area west of Canberra. The area has historic significance as site of original gold rushes, settlement by squatters producing merino fine wool, terrorised by bushrangers during the 1800s and is now the heartland of Australia's famous wheat/sheep belt. Closer to Canberra cool climate wineries and fine food production has also expanded and we will sample some local produce during the day.

The day will include:

- visit to Yandilla mustard enterprise – (food as well as biofumigant products)
- a biofumigant seed producer
- a visit to a typical Australian farm (sheep shearing etc) with Aussie BBQ lunch
- a local glass artisan who supplies his wares to the English Royal Family
- a visit to a local winery where we can sample some local food

### Proposed tour schedule

8.00 am	Depart Canberra via Yass to Wallendbeen Commentary on bus of exploration, settlement, land use, agriculture, in the region
10.00 am	Arrive David Jacobs farm View sheep dogs in action, shearing Morning tea and description of typical Australian mixed farm Discussion of biofumigant seed production
12.00 noon	Depart Farm
12.15 pm	Arrive Yandilla Mustard Enterprise Wallendbeen Inspection of facilities, history of mustard industry Lunch
2.00 pm	Depart Yandilla Visit Young Visit John Gilbert Grave (Bushranger) Binalong Visit Cooma cottage
3.30 pm	Arrive Jeir Creek winery for winery tour, for wine tasting and gourmet local food
5.30 pm	Depart winery
6.00 pm	Arrive Canberra 6.00 pm

Note: Exact plans may change a little depending on numbers and specific interests of those involved as there are alternative attractions along the route.

## Poster List

**Disease control****Nematodes**

- POS-101 Influence of soil biofumigation in the control of *Meloidogyne javanica*, *Mesocriconema xenoplax* and free living nematodes in different soil layers using castor cake and cabbage  
*Cesar Bauer Gomes (Brazil)*
- POS-102 Management of *Meloidogyne incognita* (Kofoid et White) Chitw. in organic horticulture  
*Giovanna Curto (Italy)*
- POS-103 Effect of biofumigation on different plant parasitic nematodes  
*Michaela Schlathöelster (Germany)*
- POS-104 Biofumigation for the control of root-knot nematodes on flower crops  
*Giuseppe De Mastro (Italy)*
- POS-105 Effectiveness of biofumigating *Brassica* treatments for the control of root-knot nematode *Meloidogyne incognita* on melon and watermelon  
*Giuseppe De Mastro (Italy)*
- POS-106 Biofumigation in greenhouse for the control of root-knot nematodes  
*Giuseppe De Mastro (Italy)*
- POS-107 Control of carrot root-knot and cyst nematodes by biofumigating treatments  
*Giuseppe De Mastro (Italy)*
- NO POSTER** Assessing bionematicide effect of vegetable extracts on *Meloidogyne javanica* hatch  
*Seddigheh Fatemy (Iran)*
- NO POSTER** Potential impact of green manure crops on the sustainable sugar beet cyst nematode management in Idaho, USA  
*Saad L. Hafez (USA)*
- POS-108 Biofumigation for control of *Globodera pallida* in UK potato fields  
*James Lord (UK)*
- POS-109 Effectiveness of biofumigation technique to control the southern root-knot nematode (*Meloidogyne incognita*) in Sicily  
*Giuseppe Marano (Italy)*
- POS-110 Nematode suppressive effect of two biofumigation crops (*Brassica juncea* and *Cleome hussleriana*) evaluated by laboratory and greenhouse experiments  
*Tomoko Mitsuohori (Japan)*
- POS-111 Organic amendments and host resistance as components of integrated disease management strategy for root-knot nematode *Meloidogyne incognita* in lettuce  
*Nordalyn Pedroche (Philippines)*
- POS-112 Optimizing biofumigation varieties and blends for non chemical control method against plant parasitic nematodes and soil born diseases in temperate climates  
*Michaela Schlathöelster (Germany)*
- POS-113 Cover crops in the year before planting potatoes – a key factors in the spraing disease management strategy  
*Sanja Manduric (Sweden)*
- POS-114 Expression of a 70 KDa heat shock protein (HSP70) in *Caenorhabditis elegans*, as an indicator of allyl isothiocyanate toxicity in mustard  
*Akal Rachna K. Saini (Canada)*
- POS-115 Behavioral response of *Meloidogyne incognita* to benzyl isothiocyanate  
*Inga Zasada (USA)*

**Fungi**

- POS-116 Biofumigant activity of Brassicaceae against soilborne fungi  
*Francesco Faretra (Italy)*
- POS-117 Effects of soil Sulphur and Nitrogen on Isothiocyanate production within Brassica species and subsequent mycelial inhibition of *Rhizoctonia solani*  
*Robin Harding (Australia)*
- POS-118 Introduction of fumigation crop research against soil-borne diseases and nematode in Japan  
*Ken Hashizume (Japan)*
- POS-119 Biofumigation to control *Verticillium* wilt influenced by plant species and soil types  
*Luca Lazzeri (Italy)*

- POS-120 Biofumigation against soilborne pathogens and weeds of strawberry  
*Scott Mattner (Australia)*
- POS-121 Growing crops of *Brassica juncea* and then incorporating their residues give complementary control of *Rhizoctonia* root rot of sugar beet  
*Natacha Motisi (France)*
- POS-122 Biofumigation for soil-borne disease management in flower bulb culture  
*Gera van Os (The Netherlands)*
- POS-123 Evaluating biofumigant amendments for the management of diseases caused by sclerotial pathogens in vegetable crops  
*Oscar Villalta (Australia)*
- POS-124 Biosolarisation as an alternative to methyl bromide in protected pepper crops in Spain  
*Miguel Diez-Rojo (Spain)*
- POS-125 The use of vinasses in the management of soil-borne pathogens  
*José Antonio López Pérez (Spain)*
- POS-126 Isolation of cDNAs upregulated in *Alternaria alternata* tolerant to lethal concentrations of 2-propenyl isothiocyanate  
*Maria Elene Baez Flores (Mexico)*
- POS-137 Incorporation of *Brassica nigra* and *Diplotaxis tenuifolia* residues and incubation under different soil conditions affects the survival of *Rhizoctonia solani* AG2-1 (ZG5), the causal agent of damping off of canola differently  
*Titiek Yulianti (Indonesia)*
- Bacteria**
- POS-127 Evaluating biofumigation for soil-borne disease management in white potato  
*Fe Abragan (Philippines)*
- POS-138 Potency of Brassica residues as biofumigation for control of bacterial wilt of tobacco in Indonesia  
*Titiek Yulianti (Indonesia)*
- Insects**
- POS-128 *A Folsomia candida* (Collembola: Isotomidae) bioassay to investigate biofumigation process by *Brassica carinata* seed meals  
*Lorenzo D'Avino (Italy)*
- Soil and plant processes**
- POS-129 Potentially mineralizable nitrogen is soil amended with biocidal and non-biocidal plant materials  
*Luca Lazzeri (Italy)*
- POS-130 An alternative pathway for glucosinolate degradation in soil  
*Onofrio Leoni (Italy)*
- POS-131 Isolation and technological characteristics of *B. carinata* myrosinase  
*Onofrio Leoni (Italy)*
- POS-132 Myrosinases from *Crambe abyssinica* seeds: a new tool for biofumigation?  
*Onofrio Leoni (Italy)*
- POS-133 A long-term green manure trial within intensive cropping in Tasmania  
*Leigh Sparrow (Australia)*
- POS-134 Selection of *B. napus* and *B. rapa* lines for biofumigation potential  
*Stuart Gowers (New Zealand)*
- POS-135 Bioprospecting for endophytes from Australian flora with mycofumigation potential  
*Ross Mann (Australia)*
- POS-136 Travelling the green route to soil fumigation  
*Sue Hockland (UK)*
- POS-139 New products based on Brassicaceae materials: a liquid formulation with fertilizing and biocidal effects for application in drip irrigation  
*Luca Lazzeri (Italy)*
- POS-140 A simple analytical method for dhurrin content evaluation in cyanogenic plants for their application as biofumigant  
*Luca Lazzeri (Italy)*
- NO POSTER** Effect of rape/wheat strip intercropping on disease resistance, yield and agronomic characters of winter wheat  
*Chunlei Zhang (China)*
- NO POSTER** Effects on Paddy field Environment and Rice Growth  
*Xiu-fu Zhang (China)*

## Field Trip – CSIRO Ginninderra Experiment Station

Wednesday 23 July, 1.00pm – 3.00pm

### Background

CSIRO Plant Industry maintains the Ginninderra Experiment Station (GES) near Canberra to conduct a range of field research on crop, pasture and animal science. The farm is a total of 700 ha, with 100 arable, 80 irrigated and the remaining area supports a flock of 3000 fine-wool merino sheep and some fat lambs on native and improved pastures. CSIRO used the farm for its mustard breeding program (Rex Oram), initially for condiment types, and then canola-quality mustard. We have conducted a number of research projects on biofumigation at GES since 1995 including;

1. Screening of 85 different species/varieties for biofumigation potential  
(*Kirkegaard and Sarwar 1998, Plant and Soil*)
2. Studies on take-all suppression by canola and mustard rotation crops  
(*Kirkegaard et al 2000; Smith et al 2004; Australian Journal Agricultural Research*)
3. Inheritance of root glucosinolates in canola  
(*Kirkegaard et al 2001, Australian Journal Agricultural Research*)
4. Release of ITCs in soil following *Brassica* green manures  
(*Morra and Kirkegaard, 2002; Gimsing and Kirkegaard 2006; Soil Biology Biochemistry*)

### Biofumigant species and varieties on display

A range of different species and varieties which have been used as biofumigants or cover crops in different parts of the world have been sown so that delegates can see the variety of Brassicaceous plants utilised for Biofumigation. The collection is not exhaustive, but includes most of the species currently used, and some specific varieties which are either in use or have been used previously as cover crops or to produce seed meals or other products. Representatives who provided the seed will give some background to the development and characteristics of the varieties and how they are currently marketed or utilised.

Brief notes and a field map are shown on the following page indicating those who have developed or marketed the varieties and the key characteristics.

### Incorporation strategies

CSIRO researchers, along with visitors from USA (Matt Morra) and Denmark (Anne Louise Gimsing) have also conducted several experiments to investigate the effect of different incorporation strategies on isothiocyanate release in soils. We have demonstrated the importance of significant tissue disruption, rapid incorporation and sufficient water in increasing ITC release from incorporated tissues. The benefits of maximising ITC release must be considered against potential damage from excessive cultivation and the non-ITC benefits of the green manure which are significant in many systems.

We will inspect the approaches used and discuss the relative merits of different incorporation strategies used by different growers and groups from around the world.

## Field plan and species/variety notes

Species/Variety	Use/Origin/Company/Representative
Idagold ( <i>Sinapis alba</i> )	Incorporation demonstration area
Fumus ( <i>Brassica juncea</i> )	
BioQure-Mulch ( <i>Brassica napus/campestris</i> )	
<b>Nemat</b> ( <i>Eruca sativus</i> )	<b>Biofumigant</b> Italy/Triumph Italia Spa/Patalano-Lazzeri
<b>Adagio</b> – Fodder raddish ( <i>Raphanus sativus</i> )	<b>Nematode resistant cover-crop</b> Germany/PH Petersen /Schlathölter
<b>Maxima-Plus</b> - Rape ( <i>Brassica napus</i> )	<b>Fodder rape – very low GSL</b> Kirkegaard
<b>BioQure-Mulch</b> – Rape-turnip ( <i>Brassica napus/campestris</i> )	<b>Biofumigant</b> NZ/ Wrightson PGG/Gowers
<b>Rex</b> – Indian mustard ( <i>Brassica juncea</i> )	<b>Condiment</b> Australia/Jacobs
<b>Idagold</b> – White mustard ( <i>Sinapis alba</i> )	<b>Oilseed (meal for biofumigant)</b> USA/Uni Idaho/Morra
<b>CT 207</b> ( <i>Brassica carinata</i> )	<b>Biofumigant</b> Italy/Triumph Italia Spa/Patalano-Lazzeri
<b>ISCI 7</b> ( <i>Brassica carinata</i> )	<b>Biofumigant</b> Italy/Triumph Italia Spa/Patalano-Lazzeri
<b>Arid</b> ( <i>Brassica juncea</i> )	<b>Low-GSL oilseed mustard</b> Canada/Kirkegaard
<b>Nemfix</b> ( <i>Brassica juncea</i> )	<b>Biofumigant</b> Australia/Seedmark/Robertson
<b>Fumus</b> ( <i>Brassica juncea</i> )	<b>Biofumigant</b> Australia/Agseeds Research/Kirkegaard
<b>Mustclean</b> ( <i>Brassica juncea</i> )	<b>Biofumigant</b> Australia/Jacobs
<b>Katy</b> ( <i>Brassica juncea</i> )	<b>Condiment oilseed</b> Australia/Jacobs
<b>ISCI 99</b> ( <i>Brassica juncea</i> )	<b>Biofumigant</b> Italy/Triumph Italia Spa/Patalano/Lazzeri
<b>ISCI 61</b> ( <i>Brassica juncea</i> )	<b>Biofumigant</b> Italy/Triumph Italia Spa/Patalano/Lazzeri
<b>ISCI 20</b> ( <i>Brassica juncea</i> )	<b>Biofumigant</b> Italy/Triumph Italia Spa/Patalano/Lazzeri

## Small plot nursery

Turnip	Turnip	Turnip	Collard	B carinata	Radish
Radish	Radish	Radish	Radish	Radish	Radish
Radish	Radish	Fodder rape	Fodder rape	Fodder rape	Fodder rape
Hakuran x swede	Swede x rape	Swede	Bulb juncea	Bulb juncea	Bulb juncea
Bonchoi (B juncea)	Mustard	Mustard	Mustard	Mustard	Kale