

Rediscovering Cover crops

Kelvin Montagu

Julie Finnigan

**Integrated
Crop Protection**
PROTECTING CROPS



Soil Wealth
NURTURING CROPS

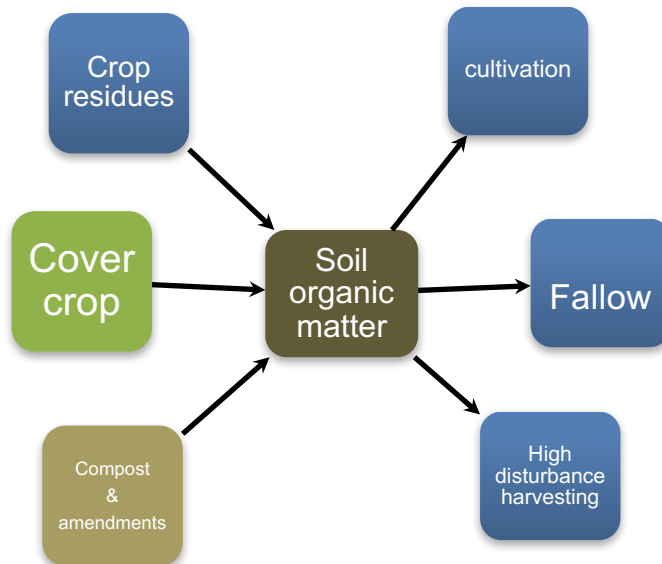




Where do cover crops fit in - Soil Health

Inputs

Organic matter



Losses

CO₂





What's your cover crop aim?


- ***Cover & protect soil***


- water & wind erosion



- ***Maintain – build soil organic matter***

- Green manures 20 -120 t/ha of fresh plant material

-  15% dry matter
 - 3 - 20 t/ha dry weight

-  10% converted to soil organic matter
 - 0.3 – 2 t/ha of soil organic matter





Soil Wealth



What's your cover crop aim?

- **Soil structure improvement from root growth**

- Building & stabilising soil aggregates



- Breaking & stabilising pans



structure benefits will be seen
before organic matter increases



What's your cover crop aim?

- **Nutrient recovery**

deep rooting to recover nitrogen



Add nitrogen

legume cover crops 20 KgN/tDW.



100 – 200 kgN/ha

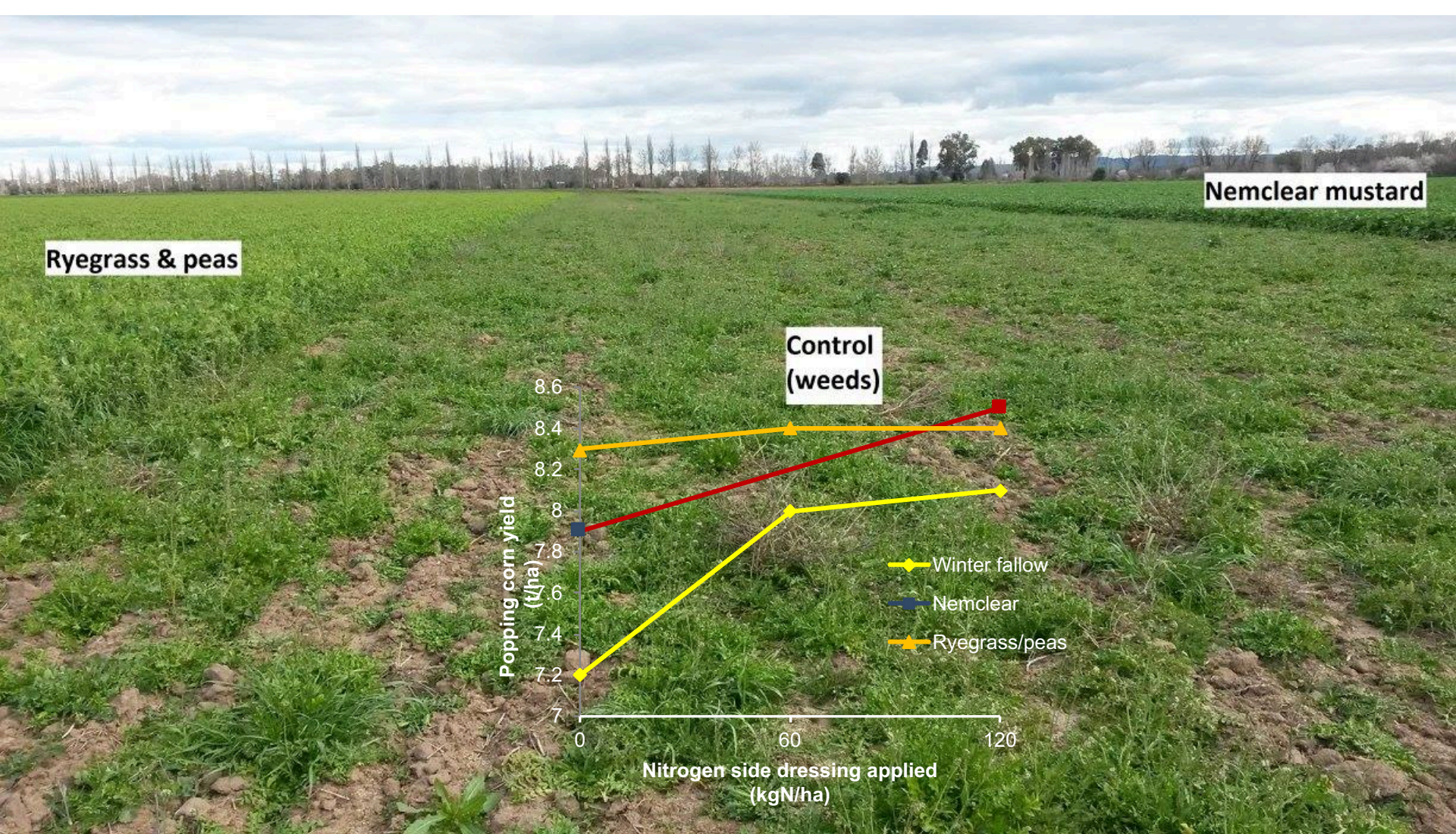


Inoculate



High soil N





- Test strips
- May need to adjust inputs to see benefits



What's your cover crop aim?

- **Weed suppression**

- physical



- chemical (Julie Finnigan to cover 1 December)



What's your cover crop aim?

- **Soilborne diseases**

- **Biofumigation** (Julie Finnigan 1 December)

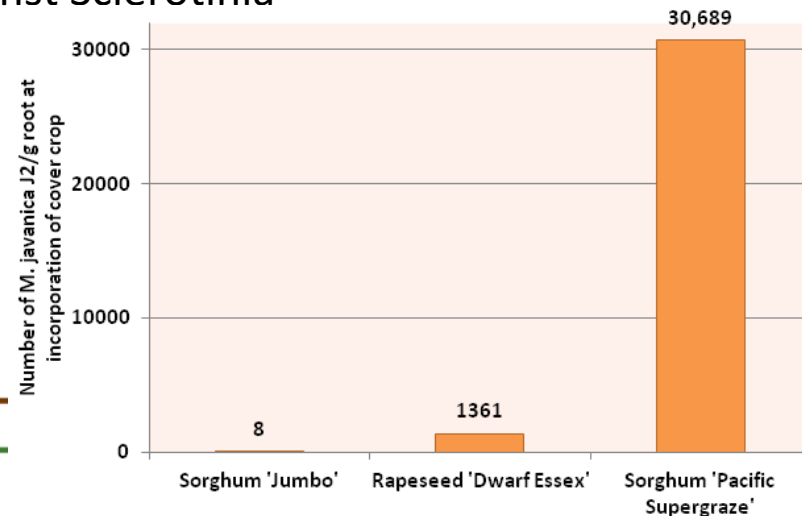
Careful selection required

- poor choice can increase SBD
- E.g. club root – avoid brassica cover crops
- Sclerotinia wide host range (see Sclerotinia webinar)
 - True cereals have plant defence against Sclerotinia



- Nematodes

- Species and cultivar important





Cover crops can host SBD



Cereals a good break crop in vegetable production





Cover crops and beneficial microbes

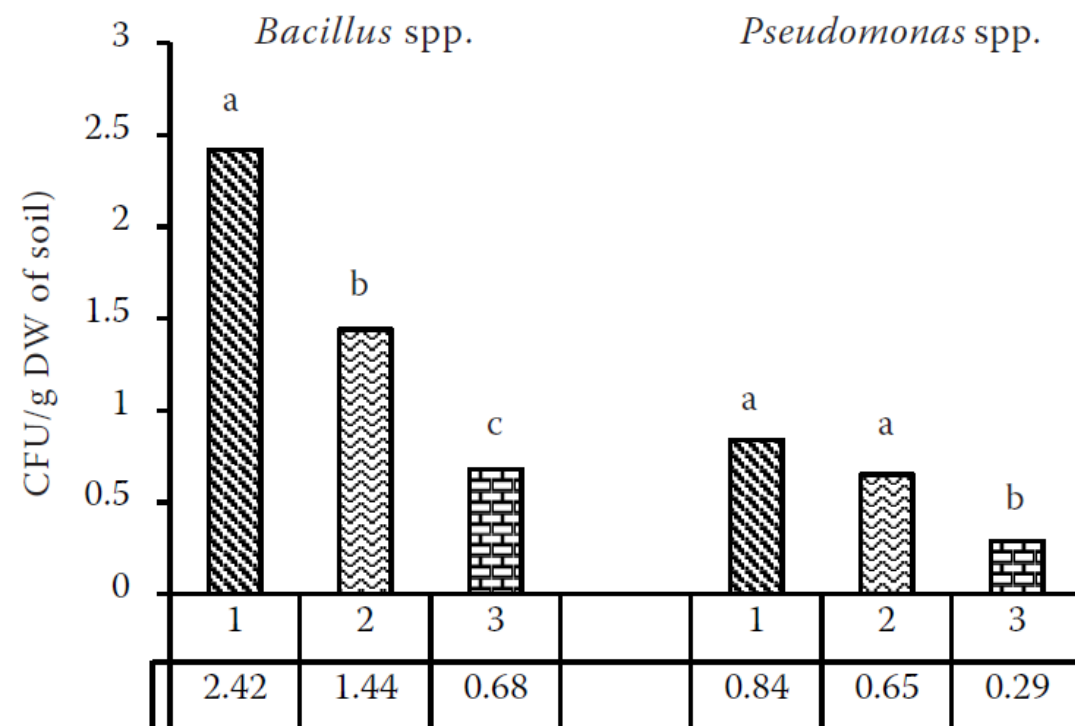


Figure 2. Total number of *Bacillus* spp. and *Pseudomonas* spp. isolated from the soil after oat (1), spring vetch (2) and tansy phacelia (3) cultivation (means from the years 2006–2008). Means differ significantly ($P < 0.05$) if they are not marked with the same letter. DW – dry weight



Choosing a cover crop

Once you have worked out your main objective

- **Grasses**
- **Legumes**
- **Broad leaf/brassicas**
- **Mixtures**

- 👍 Start with what you know
- 👍 Plan early crop rotations with your agronomist
- 👍 Have seed in the shed





Cover crop mixes

- 3-4 species good for general soil health





Key cover crop management decisions

- **What window?**

- Time how long do you have? Weeks - months
- water
- winter vs summer



Have some seed in the shed

- **Sequence** – impact on following cash crop



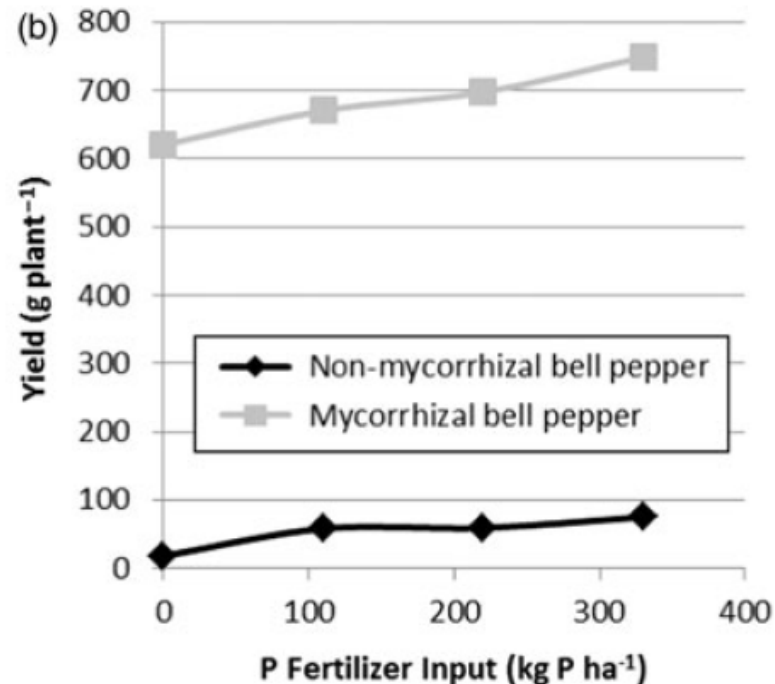
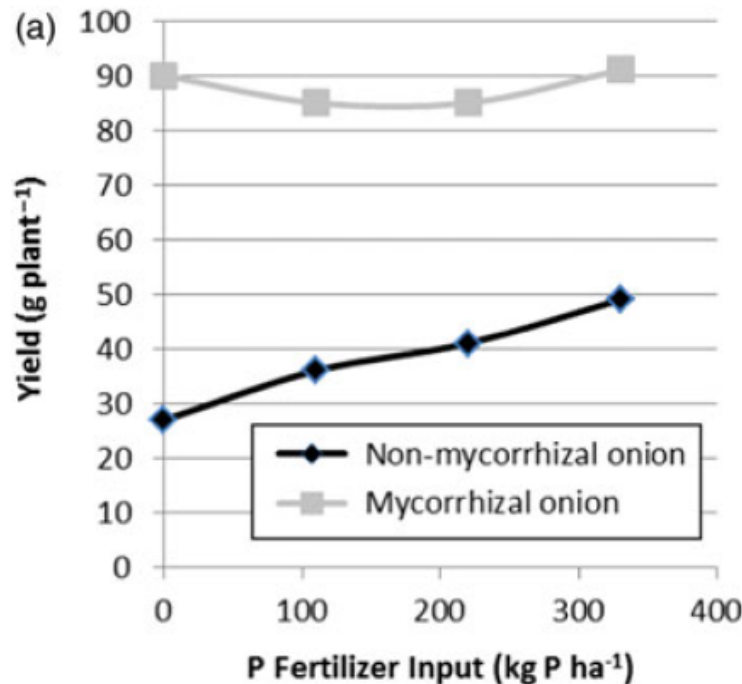
Follow good rotation practice





Sequencing - look for 1 + 1 = 3

- Avoid brassica/beets before mycorrhizal benefiting cash crop





Not just yield but pack out

Sorghum

Caliente

Rye Corn





Key cover crop management decisions

- **Cost** – direct and indirect
- **Establishment** – rates, drill vs broadcast
- **Water and nutrients**
 - Treat it as a cash crop?





Key cover crop management decisions

- **Big is better?**
 - More input but slower break down
 - Less root benefits (exudates)
- **Termination of cover crop**
- **Cover crop residue management**
 - *stubble trouble*
 - *Time and amount of cultivation*





Cover crops

- What do you want your cover crop to do?
- What time do you have?
- How much effort?



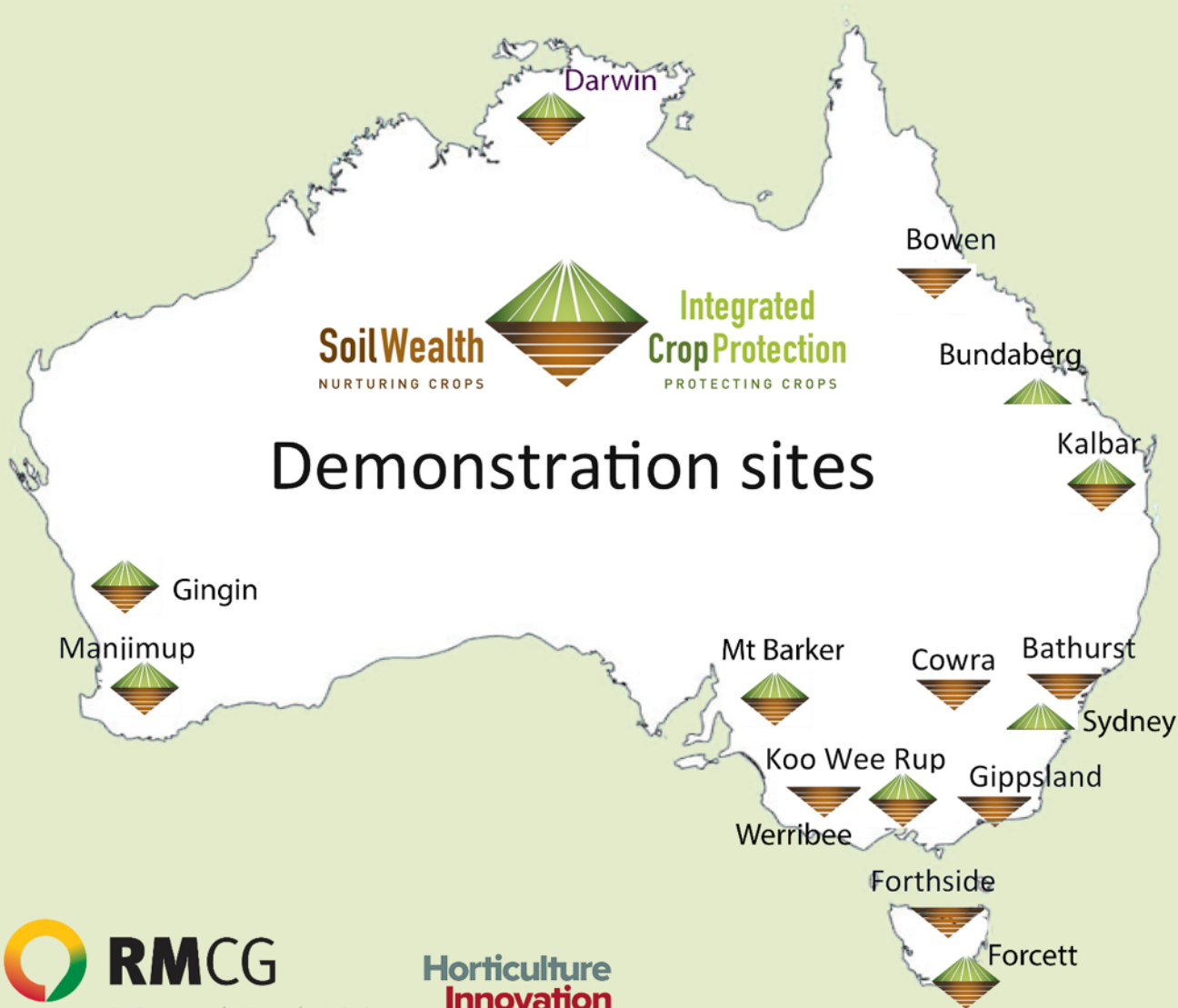


Looking back – looking forward

- Rediscovering old practices
 - What worked
 - How to include in intensive production
- Add in 21st Century tools
 - Identify new cover crop species
 - Select for plant traits which improve performance
 - Sequencing of cover crops and cash crops
 - Practical management of soil biology



Soil Wealth and ***Integrated Crop Protection*** Demonstration Sites





Thank You Questions...

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