Amelioration - where do the weed seeds go?

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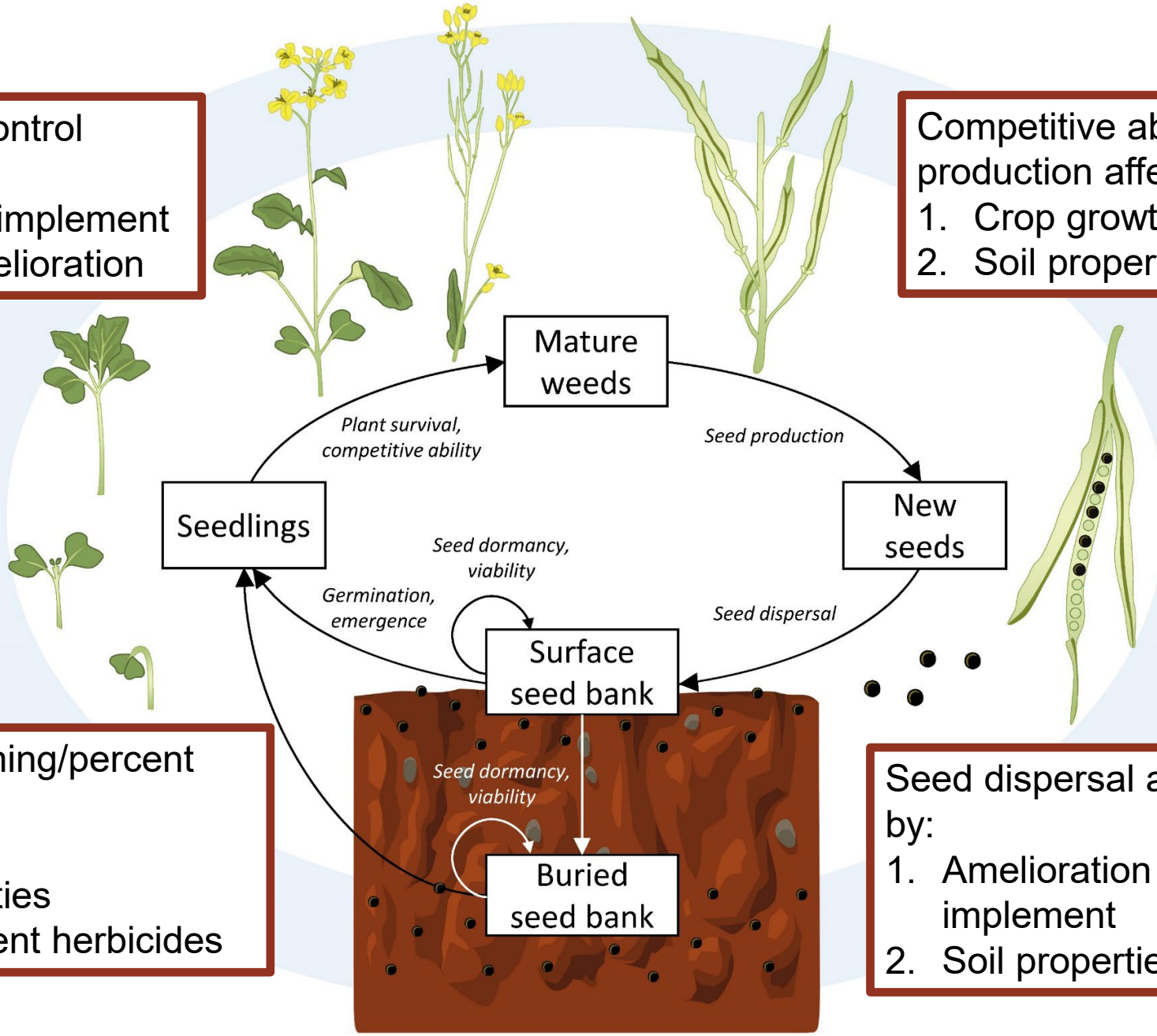
#dpirdIndustry2022

Physical weed control affected by:
1. Amelioration implement
2. Timing of amelioration

Competitive ability/seed production affected by:
1. Crop growth
2. Soil properties



Emergence timing/percent affected by:
1. Seed burial
2. Soil properties
3. Pre-emergent herbicides

Seed dispersal affected by:
1. Amelioration implement
2. Soil properties

Catherine Borger (DPIRD), image by Sina Nouraei (UWA)

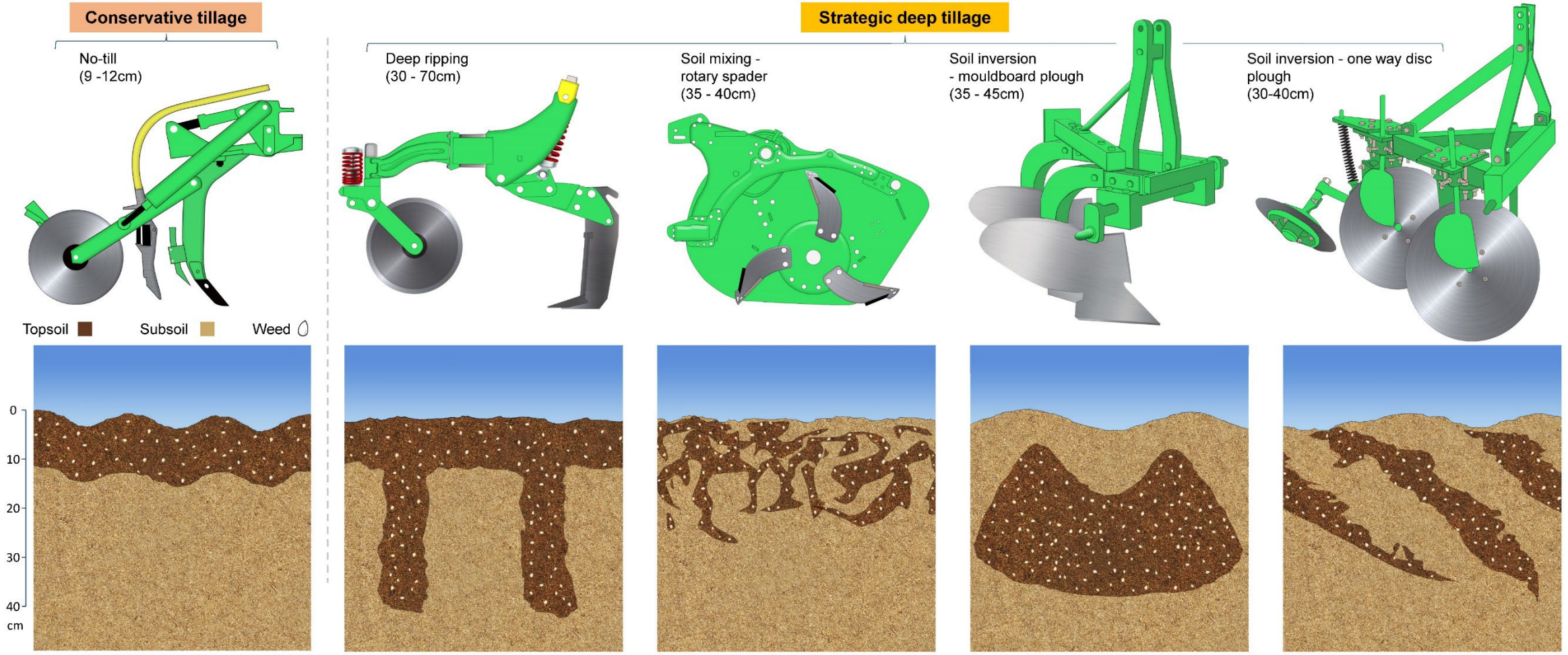
Agronomic focus – soil constraints, soil pathogens, weeds

1. Weed seed burial survey – soil inversion.

2. Weed seed burial and growth. Yerecoin, Darkan and Williams.

- Control
- Deep ripping
- Spading
- Inversion

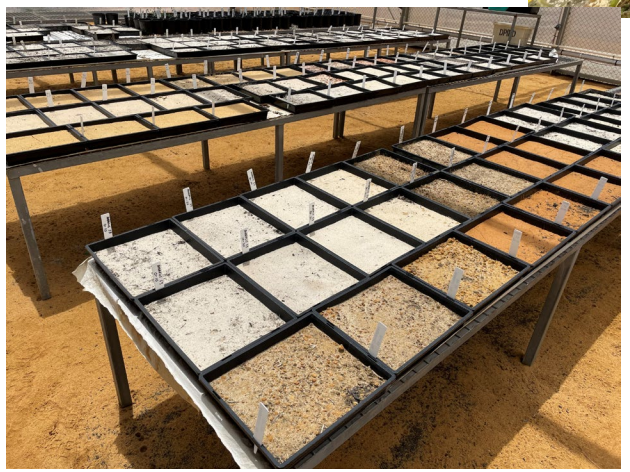
Where do the weed seeds go?

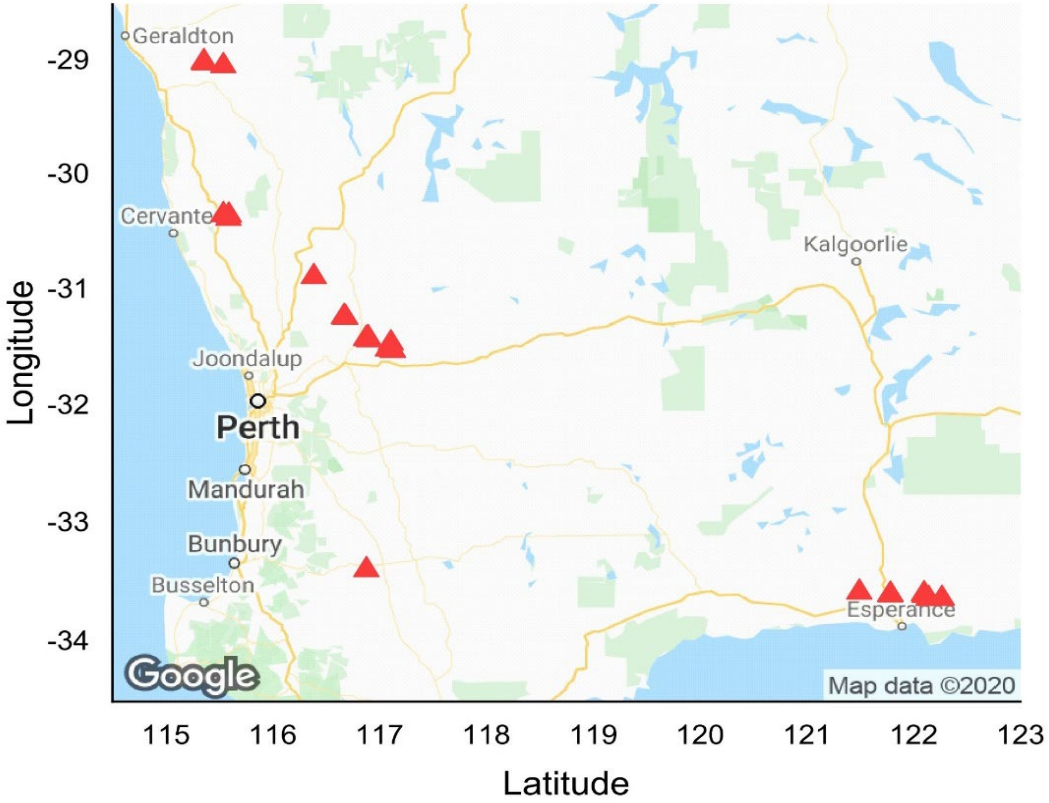


Catherine Borger (DPIRD), image by Sina Nouraei (UWA)

1. Full inversion survey

What emerged:
Annual ryegrass
Subclover
Capeweed
Great brome





Weed seed emergence from depth ($P < 0.05$, LSD 1.18)

Depths	Total emergence
0-10 cm	87
10-20 cm	136
20-30 cm	58
30-40 cm	15

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2. Where did the weed seeds go?

- Yerecoin - Sand
- Darkan - Sandy loam with gravel
- Williams - Duplex sandy gravel

Where are the seeds?

- In the control, seeds are mainly in the soil surface.

- Inversion buried about 90% of seeds at 10-20 cm.

- Ripping and spading – REALLY variable.

- Very few seeds below 20 cm.

Percent of seeds at each depth following amelioration

Yerecoin	0-10 cm	10-20 cm	20-30 cm
Control	78	22	0
Inversion	11	89	0
Ripping	91	7	2
Spading	31	58	11

Darkan	0-10 cm	10-20 cm	20-30 cm
Control	78	22	0
Inversion	12	87	1
Ripping	33	33	33
Spading	70	21	9

Williams	0-10 cm	10-20 cm	20-30 cm
Control	100	0	0
Inversion	100	0	0
Ripping	75	25	0
Spading	100	0	0

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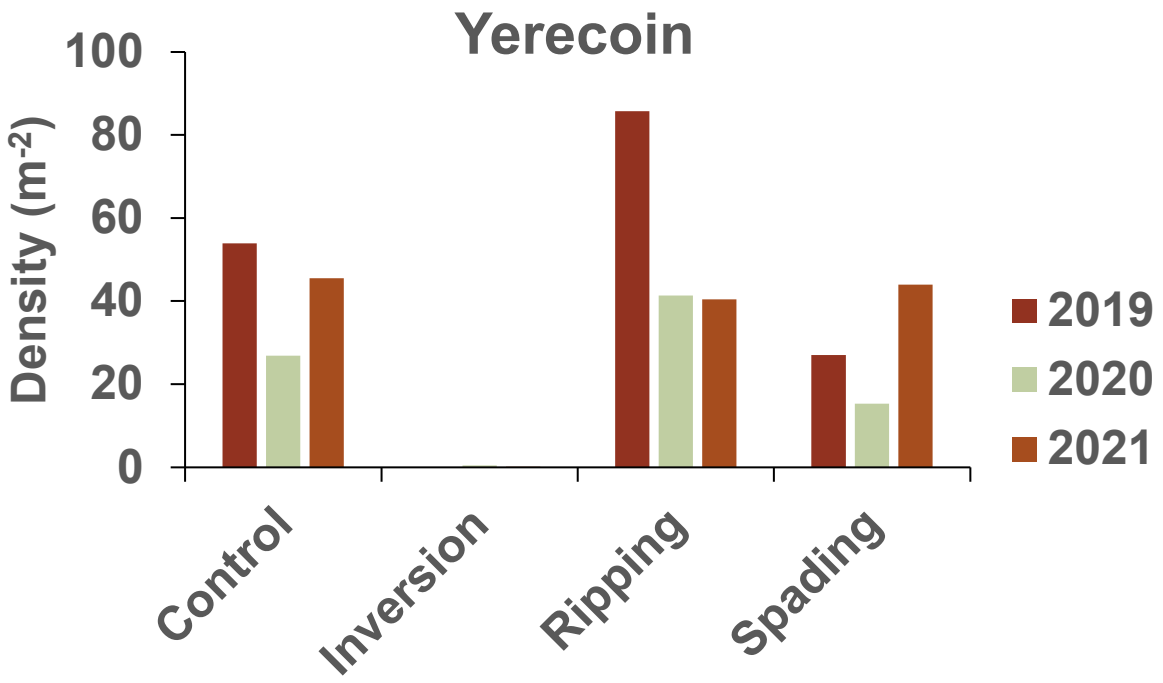
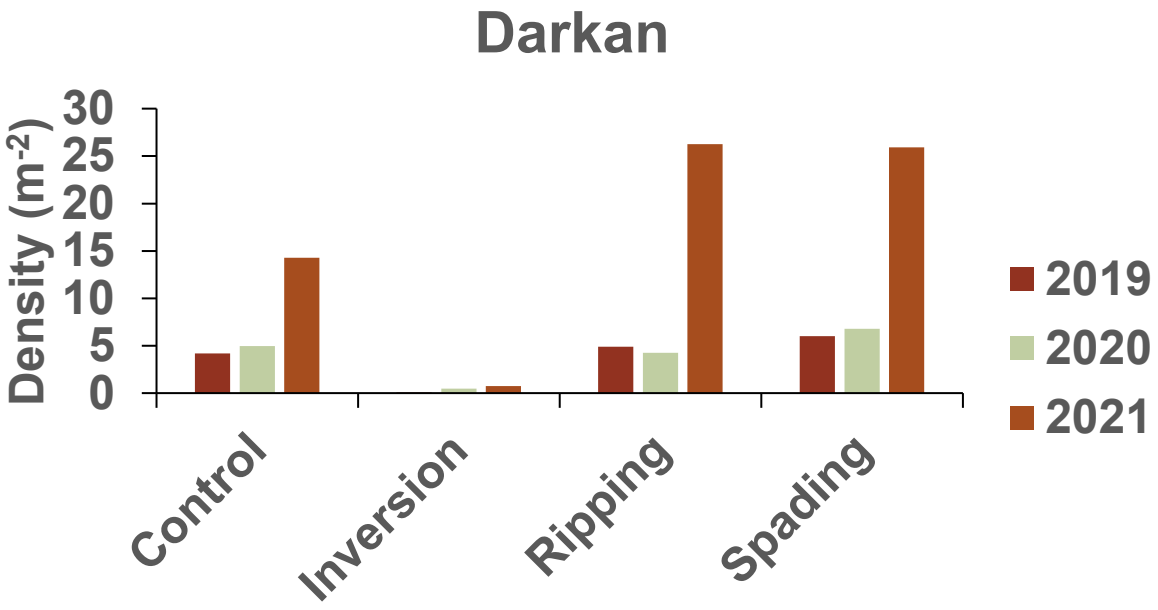
2. Weeds after amelioration: ryegrass





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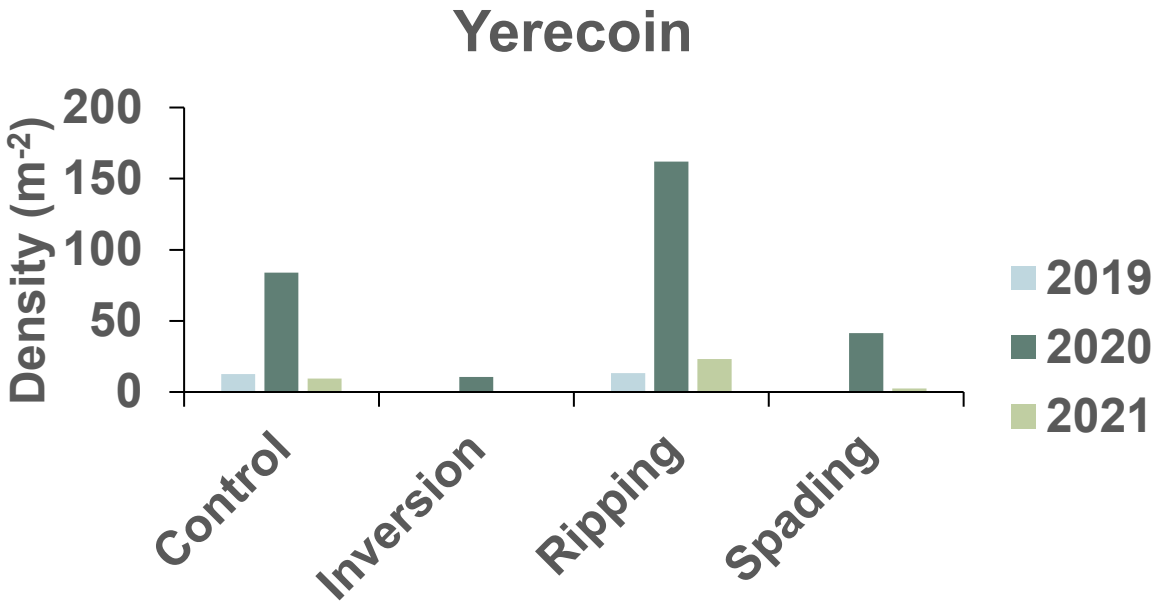
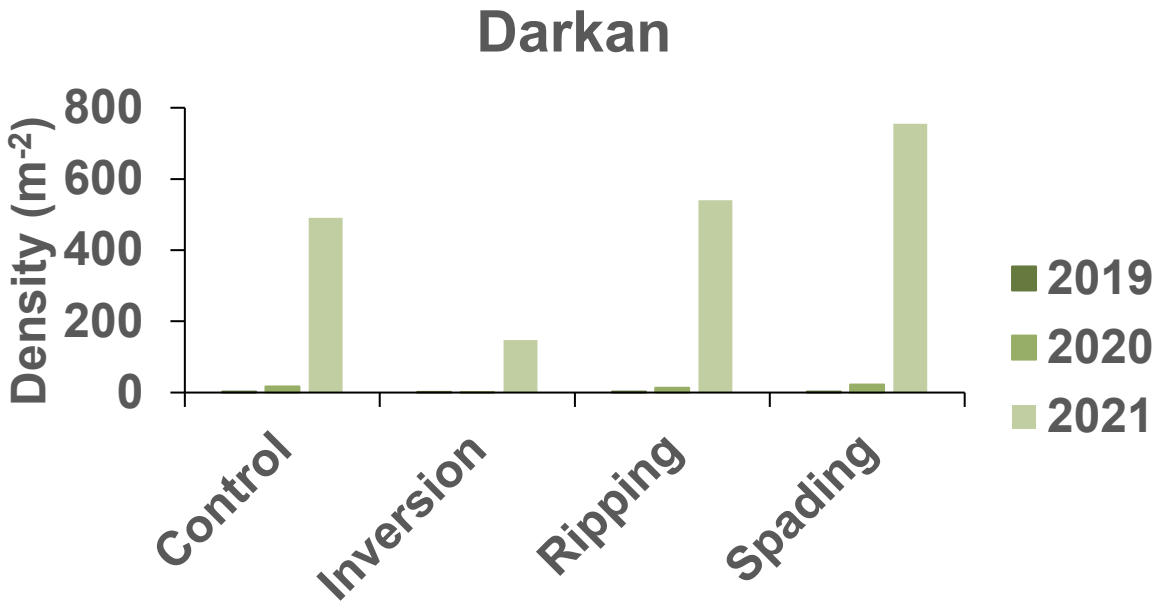
2. Weeds after amelioration: great brome





What does this mean for management?

Full soil inversion

- Seeds are not as deep as you think they are.
- Great for small seeded species – but some species will recover better than others.

Spading and ripping

- Really variable results.
- Do not stimulate weed emergence more than the normal crop sowing process – possibly because some seeds are getting buried.

Thank you

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The impact of soil amelioration on weed ecology and control: Royalties for Regions
Increasing farming system profitability and longevity of benefits following soil amelioration: GRDC-DPIRD DAW1901-006RTX

Important disclaimer