



Department of
Primary Industries



Nitrogen fixing break crops and pastures for HRZ acid soils

Project team:

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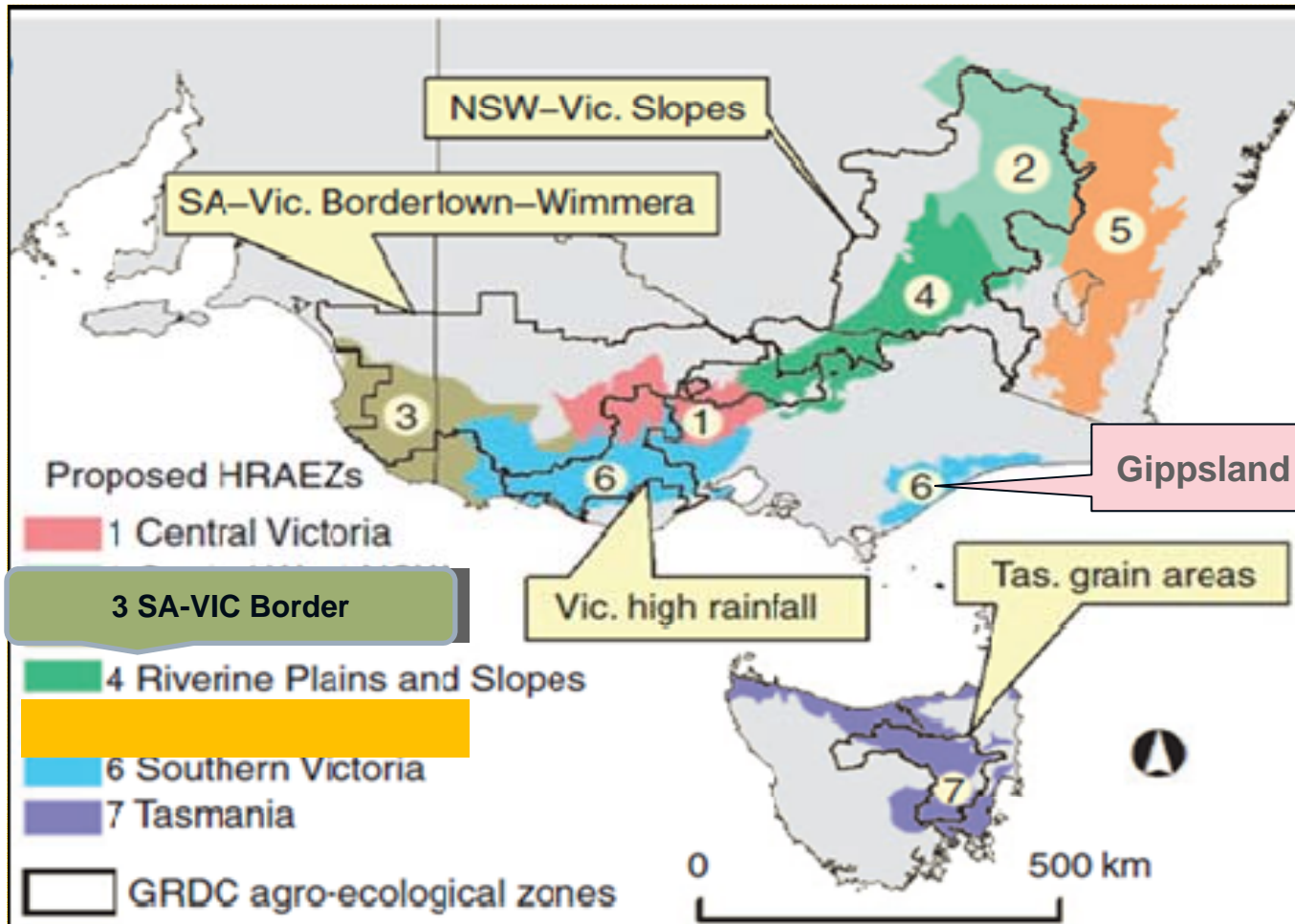
Objective

*To improve the 'performance' of legume crops
and pastures in crop sequences of the HRZ*

Outcomes:

- Reduce reliance on fertiliser nitrogen
- Manage herbicide resistance
- Improve integration of livestock into cropping systems

The HRZ target area



Source: MacEwan et al (2010)

Grain yield and shoot dry matter (DM) production

Crop + Treatment	Grain yield (t/ha)	Shoot DM (t DM/ha)
Faba, SR, +inoc	2.68	13.4
SR, -inoc	0.96	6.8
GM, + inoc	-	12.8
GM, -inoc	-	7.7
Hy, +inoc	-	14.4
Hy, -inoc	-	8.4
Lupin, SR, -+inoc	1.33	7.5
SR, -inoc	1.16	5.9
GM,+inoc	-	6.0
GM, -inoc	-	5.7
Hy, +inoc	-	6.3
Hy, -inoc	-	5.8
HDL, SR, +inoc	0.90	4.8
SR, -inoc	0.84	5.5
GM, +inoc	-	6.0
GM, -inoc	-	5.7
Hy, +inoc	-	5.2
Hy, -inoc	-	3.9
LSD (P=0.05)	0.552	3.5

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} NS

Wagga Wagga preliminary trial site



Shoot dry Matter (DM) production and measure of N₂ fixation estimates

Crop + Treatment	Grain yield (t/ha)	Shoot DM (t DM/ha)	Shoot N fixed		
			(%Ndfa)	(kg N/ha)	(kg N/t DM)
Faba, SR, +inoc	2.68	13.4	70	203	15
SR, -inoc	0.96	6.8	7	24	3
Lupin, SR, ++inoc	1.33	7.5	62	133	18
SR, -inoc	1.16	5.9	25	31	5
HDL, SR, +inoc	0.9	4.8	56	69	14
SR, -inoc	0.84	5.5	58	79	14
LSD (P=0.05)	0.552	3.5	na	66	5

Shoot dry Matter (DM) production and measure

Measure of efficiency of N fixation process
Target 70%

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Shoot dry Matter (DM) production and measure of N₂ fixation estimates

20-25 kg N/t DM
= upper levels of
N fixed

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Management impacting on N fixation

Revisit basic principals:

- Poor rhizobia survival
 - inoculation method
 - soil acidity
 - molybdenum a forgotten micro-nutrient
- Plant compromised
 - herbicide residue
 - soil acidity