NSW GOVERNMENT | Department of Primary Industries

New Pasture Species & Practices

Nigel Phillips
NSW DPI Wagga Wagga

Pastures in the cropping zone

- Traditional sub clover pastures did not perform well during drought.
- Pasture usually sown after crop so limited grazing in establishment year and seed set may be compromised in a short spring.
- Can be expensive to establish and failure during drought was high (except lucerne?)
- Relatively inflexible

“New” legumes - desirable traits

- Robust in dry years
    - higher hard seed
    - ability to set seed
- Capacity to harvest with conventional cropping machinery
- Good nitrogen fixation capacity
- Ideally, similar or better production than sub clover

“New” Legumes

Biserrula

- V.high hardseed
- Good acid/Al tolerance (Mn sensitive)
- Annual ryegrass control
- Prolific seeder (up to 1.5t/ha)
- Herbicide sensitive
- Photosensitisation issues?

French serradella

- New varieties moderate hardseed (55%)
- Good acid/Al tolerance (Mn sensitive)
- On-farm seed production common WA
- Herbicide sensitive

NSW GOVERNMENT | Department of Primary Industries

“New” Legumes

Balansa clover

- High hardseed
- Seed relatively cheap
- Waterlogging tolerant but good all round productivity
- Very adaptable

Rose clover

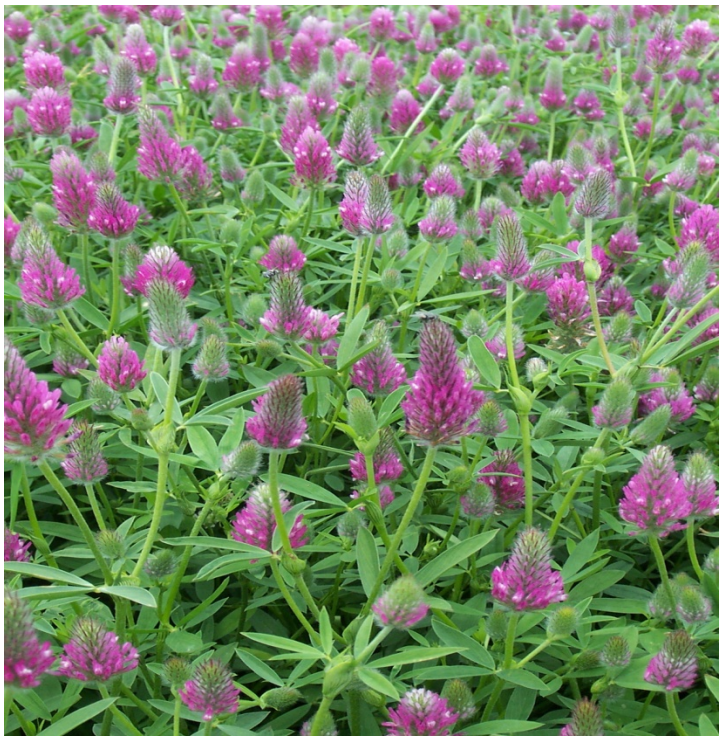
- New variety higher hardseed
- Very adaptable
- Grows well in marginal areas

NSW GOVERNMENT | Department of Primary Industries

“New” Legumes

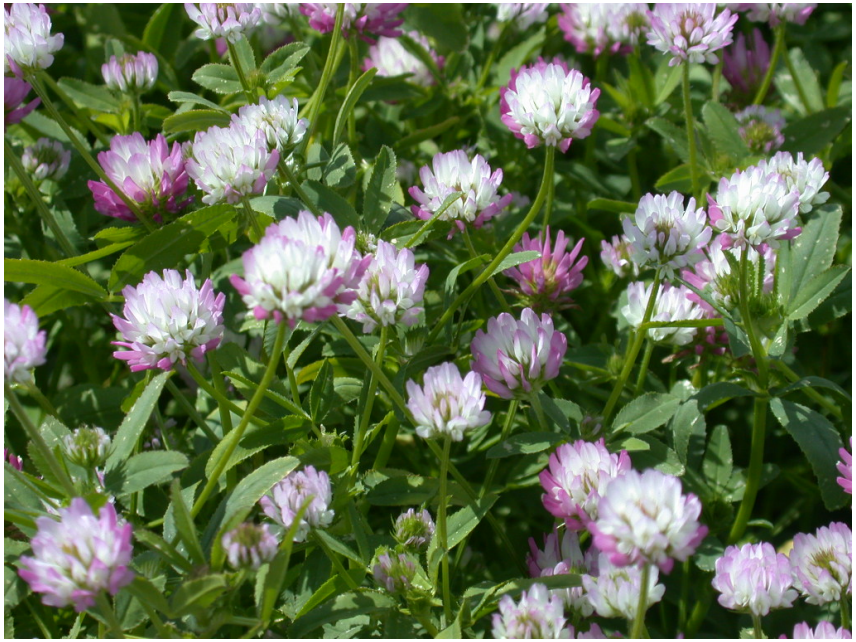
Arrowleaf clover

- Very productive and widely adapted
- High hardseed
- Productive in low pH soils



- Moderate hardseed levels
- Good productivity
- Tolerate waterloggging

“New” Legumes



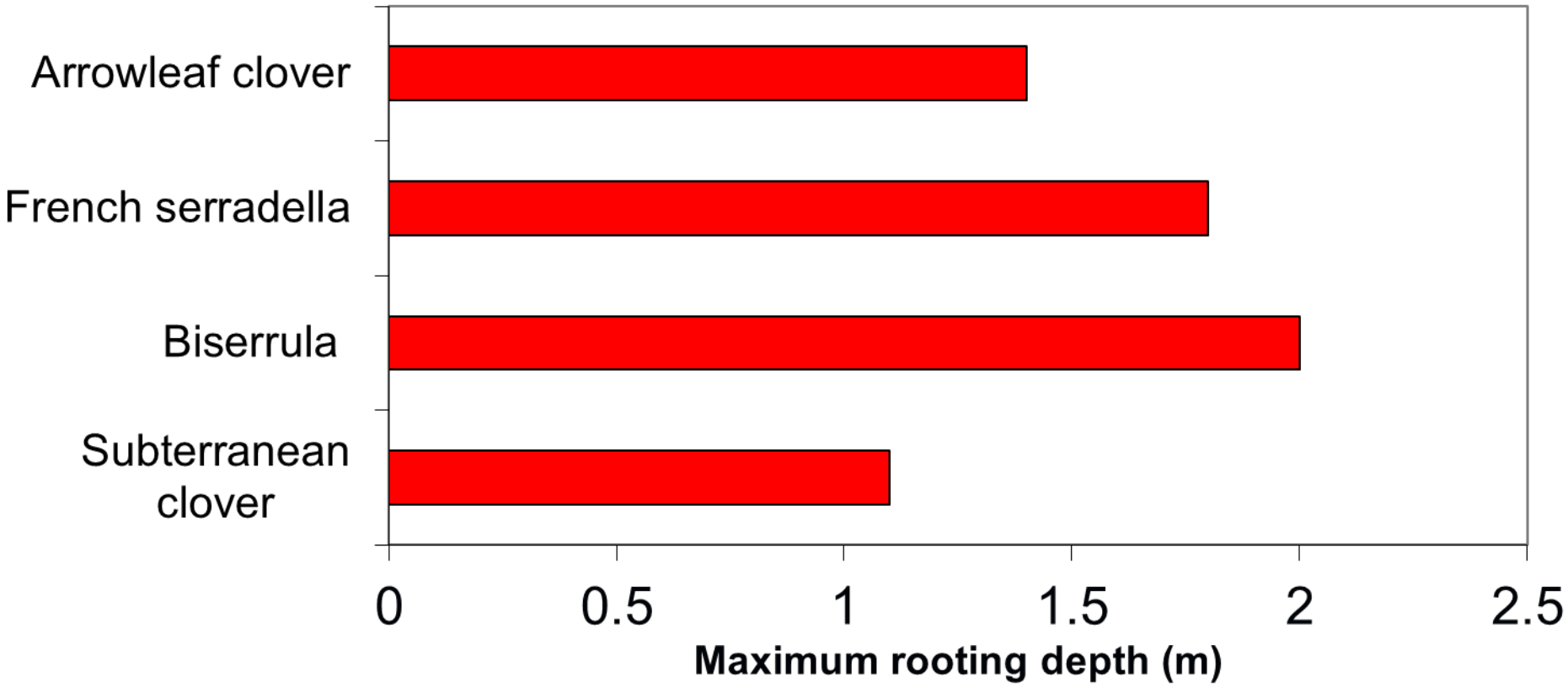
Gland clover

- RLEM resistant
- Early maturing
- Tolerates waterloggging

Bladder clover

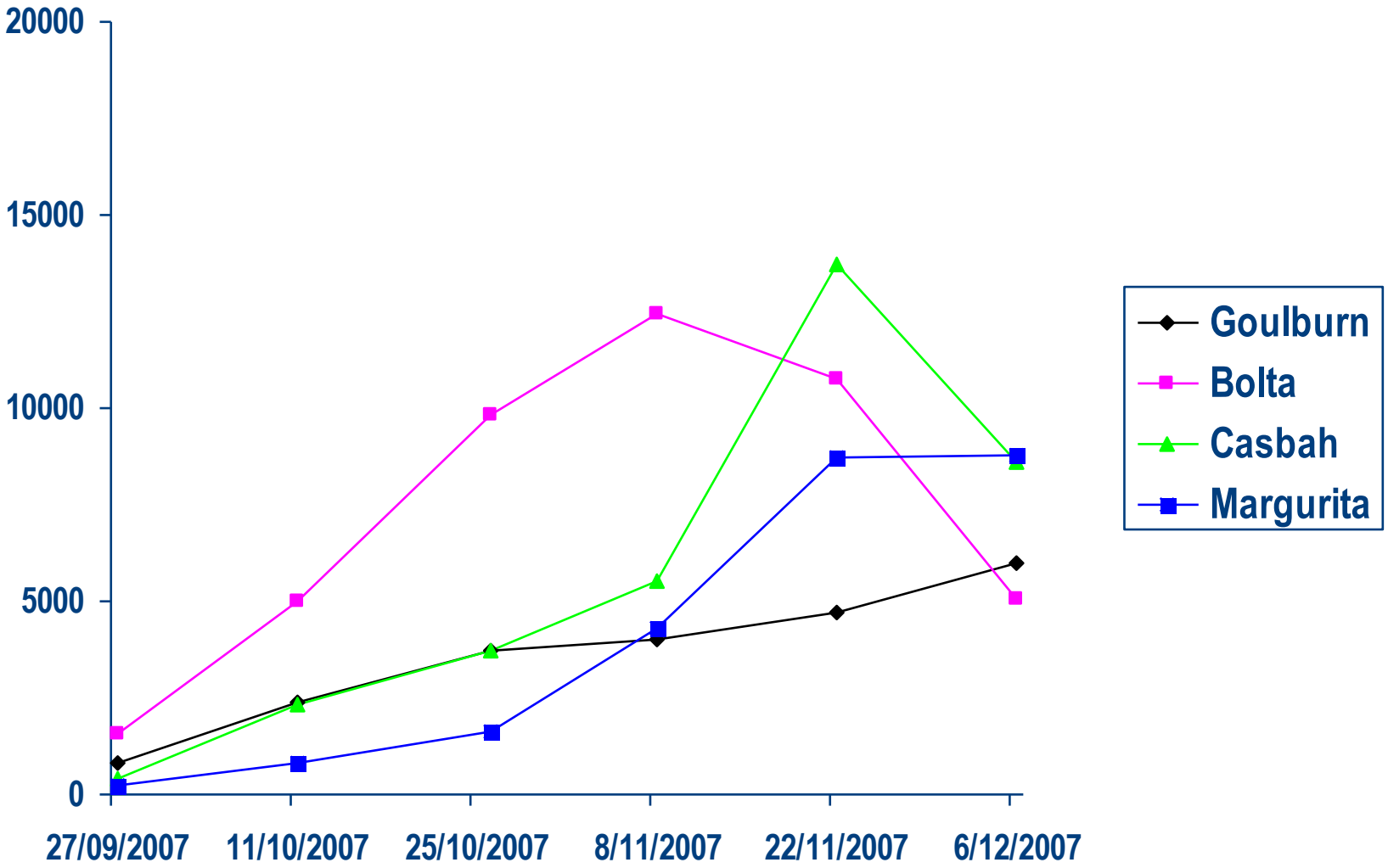
- Very high hardseed
- Moderately productive

Maximum rooting depth (m)



NSW GOVERNMENT Department of Primary Industries

Herbage production



ries

Hard Seed – a key trait

Legume species	Seed	Hard seed (%)						
	weight	Jan 99 Summer	F e b 99	Mar 99	Apr 99	May 99 Autumn	Jun 99	July 99
	(mg)							
AGWEST® Bartolo	**2.6**	**97**	**85**	**87**	**81**	**64**	**60**	**56**
Santiago	3.6	98	81	80	75	62	61	**61**
Herald	2.3	95	87	84	84	81	74	**77**
Casbah	1.2	99	94	94	82	85	81	**76**
Prima	0.7	98	91	58	60	53	46	**41**
Dalkeith	6.7	88	46	36	18	16	16	**14**
Frontier	0.7	86	37	28	15	9	4	**4**

Herbicide Tolerance

Visual ratings of herbage production.

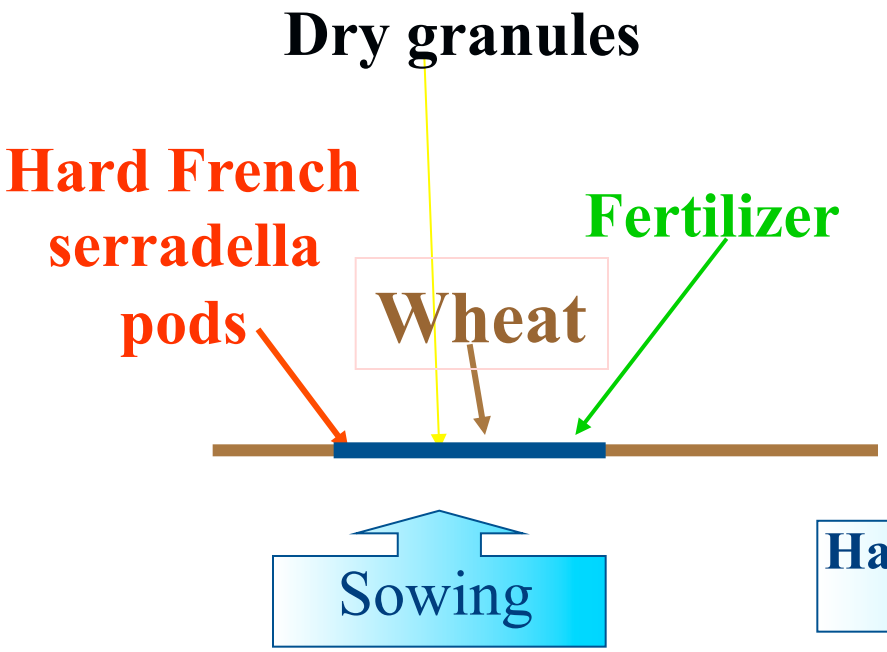
Figures in bold show acceptable damage (24 Aug.)

Species/Variety	FrontierA		PrimaA		New species under evaluation									
	Balansa clover		Gland clover		*Trigonella balansae*		Bladder clover		Purple clover		Eastern star clover		Moroccan clover	
Herbicide (rate/ha)	7 Aug.	24 Aug.	7 Aug.	24 Aug.	7 Aug.	24 Aug.	7 Aug.	24 Aug.	7 Aug.	24 Aug.	7 Aug.	24 Aug.	7 Aug.	24 Aug.
Dual Gold® (PSPE) 500 mL	63	58	96	**98**	77	69	88	**89**	94	**95**	98	**99**	69	59
Spinnaker® PSPE 70 g	90	**83**	99	**97**	94	**87**	67	54	79	55	90	**83**	65	46
Raptor® 45 g + 0.5% Hasten® + 1% ammonium sulphate	91	**79**	93	**88**	79	**69**	48	38	37	34	52	33	46	42
Broadstrike® 25g + 0.5% uptake®	92	**86**	100	**98**	88	62	92	**91**	40	29	20	16	85	**74**
Broadstrike® 25 g + MCPA 500 mL	85	**83**	88	**85**	70	**80**	73	**78**	69	53	59	66	51	49
Broadstrike® 25 g + Diuron 85 g + 0.5% Hasten®	32	37	52	42	64	49	40	22	36	11	18	11	31	24
Raptor® 22 g + Bromoxynil 750 mL + 0.5% Hasten® + 1% ammonium sulphate	41	46	92	**81**	49	41	63	46	58	42	24	28	46	30
Bromoxynil 1.5 L	41	43	66	58	31	42	48	53	80	64	39	28	78	**75**
Igran® 850 mL	27	25	8	10	59	56	25	28	75	57	68	67	40	43
Tigrex® 500 mL	87	**73**	63	64	46	54	62	63	48	34	60	49	62	67
MCPA amine 750 mL	81	**84**	80	68	85	69	53	41	42	31	61	61	44	57
2,4-D amine (625 g/L) 500 mL	54	39	17	27	48	51	32	26	34	19	39	43	55	51
2,4-DB 1.5 L	96	**78**	61	69	76	**72**	83	**86**	73	**73**	83	65	79	69
2,4-DB 700 mL + Diuron 85 g	94	**80**	52	47	44	58	80	56	73	63	88	**75**	65	49
Gramoxone® (winter clean) 500 mL	71	**73**	27	17	61	**70**	24	30	63	44	38	23	21	19
Verdict® 100 mL + 0.5% Uptake®	83	**100**	96	**96**	99	**96**	99	**96**	97	**94**	66	**72**	99	**98**
LSD ($p < 0.05$)	23	29	20	21	34	ns	28	27	19	20	35	30	29	31

Source: Christiaan Valentine and **David Ferris**, Department of Agriculture, Northam

NSW GOVERNMENT Department of Primary Industries

Twin sowing



Wheat

Hardseed breakdown of the pasture seed

First year

Second year

NSW GOVERNMENT Department of Primary Industries

Why do I think these systems will work?

Year	Soil ameloration	Sowing activity	Crop type	Comments
1989	Lime	Murex medic	Murex seed crop	
1990			murex hay crop	
1991		canola	canola	
1992			murex hay crop	
1993		wheat	wheat	
1994		canola	canola	Drought
1995	Lime	lucerne	lucerne & 5% murex hay crop	
1996			lucerne & 15% murex hay crop	
1997			lucerne & <1% murex hay crop	Drought year. Soil compaction
1998		canola	canola	
1999		wheat	wheat	
2000	Lime	murex @4kg/ha	Murex seed crop	
2001			murex hay crop	
2002			murex pasture	Drought
2003		canola	canola	Drought
2004			murex hay crop	Drought
2005			murex hay crop	Drought. Some fumitory
2006		wheat	wheat & murex	Drought. Burnt in January firestorm (hot burn) & sown to wheat - grazed out
2007			murex pasture	Drought
2008		wheat	wheat	Drought. No spring rains.

Getting inoculation right is crucial for success

- Pasture performance & persistence
- Nitrogen fixation

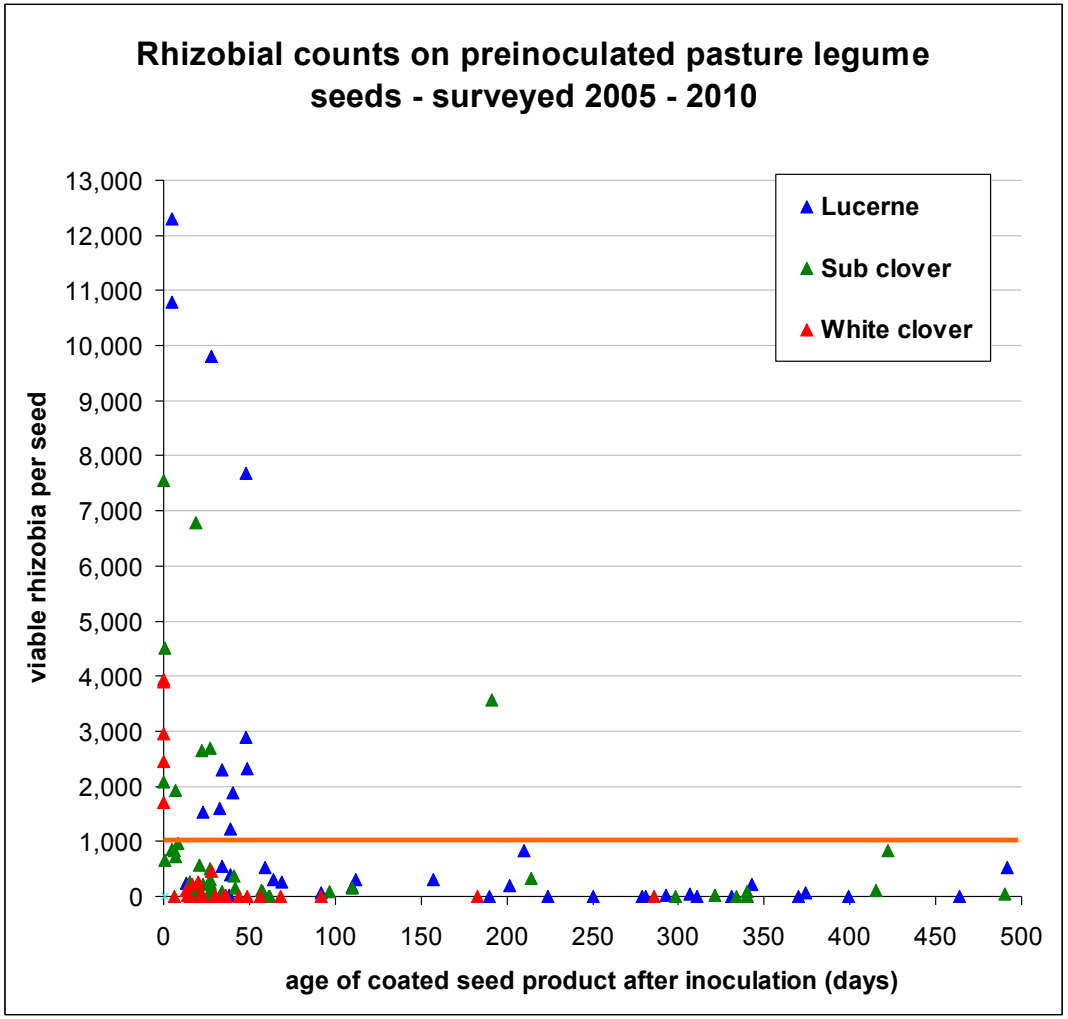
NSW GOVERNMENT Department of Primary Industries

Pre-Inoculated Seed Surveys

Source: GRDC Inoculating Legumes: a Practical Guide (2012)

- Overall, ***irrespective of brand***, the quality of pre-inoculated seed in terms of rhizobial number per seed is “variable”.

Survey year	05	06	07	08	10
No. samples	113	50	54	55	15
No. passed	6	16	3	2	2
% pass	5	32	6	4	13



NSW GOVERNMENT Department of Primary Industries

Where to from here

- Quantify Nitrogen input into cropping systems
- Bigger scale demonstrations
- Alternative sowing strategies (Summer?)
- Rhizobium work
- Photosensitisation work on Biserrula
- More herbicide work needed to gain greater adoption?

NSW GOVERNMENT | Department of Primary Industries

Questions?