

DROUGHT RESILIENT LEGUME PASTURES

PASTURE OPTIMIZATION FOR DROUGHT
SOLUTIONS
P.O.D.S.

ALTERNATE OPTIONS FOR LEY FARMING SYSTEMS

ABOUT THE SITE

Location: Murray Mallee and Upper Eyre Peninsula, SA

Annual Rainfall: 254mm and 345mm

Soil: loamy sand

Legume cultivars: Strand medic cv Seraph, French serradella cv Frano, Bladder clover cv Bartolo, Barrel Medic cv Penfield & Emperor, Yellow serradella cv SerraMax, Persian clover cv Nitro plus

Aim: increase drought resilience, through better ground cover and longer growing season.



GROWING SEASON

This trial has been operating over three growing seasons (20₂₂, 20₂₃, 20₂₄) each presenting challenges

2022 - Very wet winter and spring with rainfall continuing well into November. Some cultivars (Frano, Bartolo, Seraph) were resistant to powdery mildew, and were able to utilise late rainfall and continue growth into summer

2023 - limited winter and spring rainfall restricted biomass production, deeper rooted species (ie serradellas) survived through dry periods and responded to rainfall in late spring

2024 - dry autumn and winter has limited biomass production,





NITROGEN FIXATION

In a normal year legumes can fix ~70kg N/ha

Cultivars	Emergence (Plants/m ²)	Biomass (t DM/ha)	Ground cover (%)	Seed yield (t/ha)	DMD (%)	CP (%)	ME (MJ/kg DM)	NDF (%)	N fixed kg/ha	Coumestrol mg/kg DM
Frano	80.3 ^b	4.22 ^c	94.8 ^a	1.39 ^a	59.7 ^a	12.3 ^b	8.89 ^{ab}	48.6 ^{ab}	71.4 ^{ab}	ND
Seraph	144.7 ^a	5.93 ^a	87.5 ^a	1.47 ^a	64.8 ^a	14.2 ^b	9.20 ^a	40.1 ^c	116.7 ^b	69.2
Emperor	87.9 ^b	5.91 ^{ab}	67.5 ^b	2.56 ^a	61.0 ^{ab}	13.2 ^b	9.07 ^{ab}	45.4 ^{bc}	84.3 ^{ab}	40
Bartolo	106.8 ^b	4.81 ^{bc}	47.5 ^c	2.56 ^a	60.8 ^{ab}	18.2 ^a	8.83 ^{ab}	44.8 ^{bc}	85.4 ^{ab}	-
Cefalu	49.2 ^c	4.69 ^c	92.0 ^a	1.47 ^a	58.3 ^b	11.3 ^b	8.32 ^b	51.4 ^{ab}	82.5 ^{ab}	-
Penfield	93.9 ^b	1.63 ^d	37.5 ^c	2.01 ^a	53.3 ^c	12.3 ^b	7.19 ^c	55.7 ^a	25.8 ^a	412
Sig. (p=0.05)	<0.001	<0.001	<0.001	0.67	0.002	0.002	0.001	<0.05	0.06	
LSD	29.8	1.12	17.9	1.78	4.36	2.89	0.84	7.65	51.2	

EARLY (SUMMER/AUTUMN) SOWING AND INNOCULATION

Serradella pod segments can be sown in late summer or early autumn at 1-2cm. These hard-seeded segments will soften underground in response to temperature fluctuation and germinate in response to the opening rain. Sowing pods in summer/autumn removes the expense of scarifying seed and would allow producers to harvest and resow their own paddocks. However, summer sowing adds challenges for inoculation, as the rhizobia must survive in dry soil until germination.

Serradellas have their own unique group of inoculant (group S), but are fully compatible with Lupin inoculant (group G). This differs to the strains needed for strand (group AM) and barrel (group AL) medics. During 2023, this trial discovered that paddocks with a lupin history showed good nodulation, but the ones relying on inoculation at seeding had poor inoculation.



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