

6.2 Improving yield and protein content of crops by developing phase and ley farming systems using alternative pasture legumes

Researchers

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Background

The value of pasture legumes grown in rotation with crops is being determined at Streatham, Gnarwarre and Hamilton. At Streatham and Gnarwarre, 5 clovers (balansa, Persian, arrowleaf, red and subterranean) are being assessed for their abilities to increase yields and protein contents of subsequent crops. At Hamilton, subterranean clover is being assessed in 1:1 pasture:crop rotation with different wheat varieties and at different times of sowing

RESULTS

Streatham and Gnarwarre

At Streatham, for the second year running, grain yields of crops following balansa clover were the highest. Grain yields following balansa at Gnarwarre were also high in both years.

All annual clovers regenerated well following the crop phase and produced reasonable dry matter yields in 1999.

Grain and pasture yields for 1998 and 1999 at Streatham and Gnarwarre.

	STREATHAM			GNARWARRE		
	1998 Grain yields (t/ha)	1998 Pasture yields (t/ha)	^A 1999 Grain yields (t/ha)	1998 Grain yields (t/ha)	1998 Pasture yields (t/ha)	^A 1999 Grain yields (t/ha)
Balansa	5.6	7.3	3.2	2.2	6.1	3.0
Persian	5.0	6.3	2.5	1.8	6.3	2.5
Subterranean	4.9	4.2	2.3	1.7	3.9	2.2
Arrowleaf	4.7		2.9	1.7	6.8	2.9
Red	5.0	1.8	2.2	2.0	0.30	3.1
N fertiliser control	4.9	-	1.8	2.6	-	2.3
Continuous wheat		-	1.6		-	0.8

Preliminary results – values are for either 1:1 or 1:1 and 2:1 treatments combined

^A Grain yields following 1998 pasture yields

Nitrogen fertiliser was only applied to the N fertiliser control at 50kg N /ha/yr (110 kg/ha urea)

HAMILTON EXPERIMENT 1

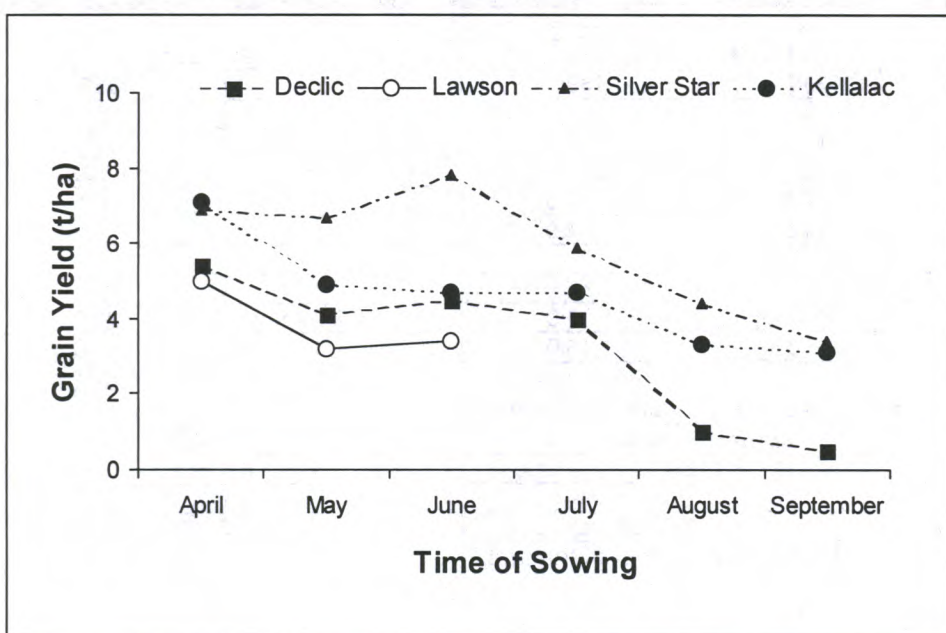
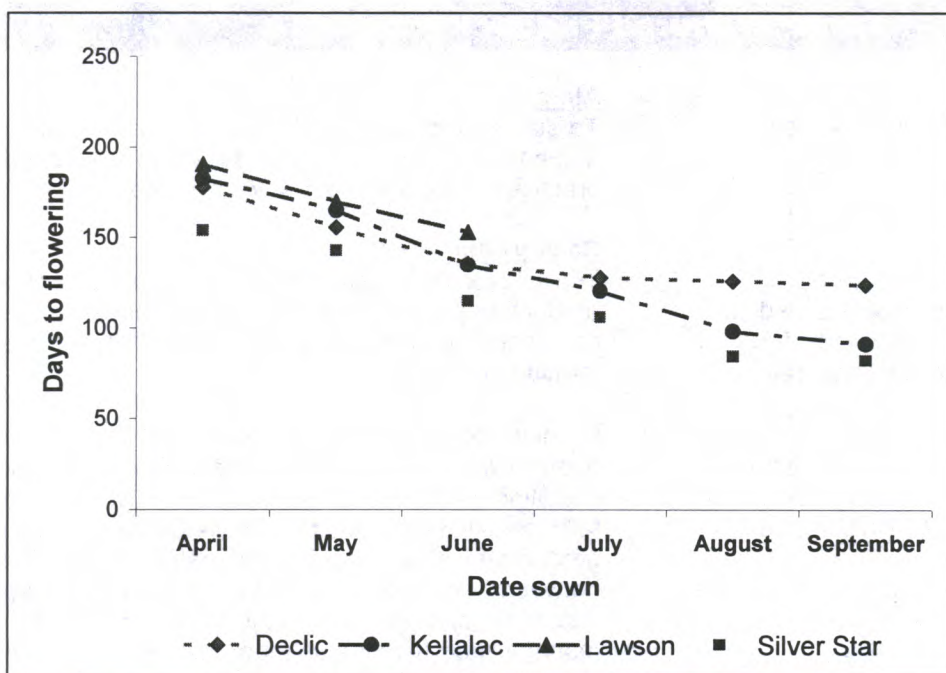
1:1 pasture:crop rotations with subterranean clover and 4 wheats (Silver Star, Kellalac, Declic, Lawson).

- Silver Star has now achieved grain yields ≥ 7 t/ha in each of two years without any N fertiliser.
- Subterranean clover pastures regenerated well in 1998 following the 1997 wheat phase (>3000 plants/m²).
- Protein contents of the wheat were good in 1997 ($>12.6\%$). 1999 wheat protein contents are still being analysed.

HAMILTON - EXPERIMENT 2

Four wheat varieties of different maturities were sown at 6 different sowing times from April to September.

- The number of days from sowing to flowering reduced the more the time of sowing was delayed.
- Silver star reduced its time to flowering at a greater rate than the other varieties.
- Generally, the earlier the crop was sown, the higher the yield.
- Grain yields of more than 3 t/ha were obtained, even with spring sowing for Silver Star and Kellalac



CONCLUSIONS

Preliminary results indicate that:

- Pasture legumes are suited to crop rotations, even short 1:1 rotations.
- Pasture legumes can improve the grain yield and protein content of subsequent crops.
- Pasture legumes appear to provide an advantage to the subsequent crops not provided by fertiliser N (50 kg/ha).
- Pasture legumes regenerate well in the year following a crop.
- Reasonable yields can be obtained from spring sowing of wheat.