

'Sub 4 Spring' sub clover cultivar experiment Rock Farm, Cave



Sub clover cultivar experiment at Rock Farm, Cave. Photo taken at the time of the first harvest on 31/7/16. Sub clover 'Antas' in the left-hand foreground (Photo: PLSC321 students).

Dryland Pasture Research Team



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Introduction

This site at Rock Farm, owned by Herstall and Alyson Ulrich, was selected to utilise farm-scale drillable areas on a sloping topography. The Claremont (Fragic Perch-gley Pallic Soil) and Timaru (Mottled Fragic Pallic Soil) soils are characterised as being moderately deep and poorly drained with moderate plant available water.

Experimental aim: To assess the survival and production of sub clover cultivars on clay soils prone to water logging.

Methods

Site preparation

Date	What and rate
9/9/15	Fertiliser*: 200 kg/ha Ammo31 and 2000 kg/ha dolomite
9/11/15	Fertiliser: 190 kg/ha Nprotect
5/1/16	Herbicide: 3 L/ha Glyphosate 360
2/2/16	Herbicide: 2 L/ha Glyphosate 360 plus 40g granstar
12/2/16	Fertiliser: 250 kg/ha Crop20
25/2/16	Lightly cultivated with Ground Hog soil aerator

Treatment

Six sub clover cultivars (Antas, Leura, Denmark, Monti, Napier, Narrikup, and Woogenellup) at 20 kg/ha and a control of Nomad white clover at 14 kg/ha. Sown on 10/3/16 with a Taege Series 300 seed drill. Site then rolled with a Cambridge roller.

Plots

Each plot is 2.8 x 25 m. There are six replicates partially randomised in two blocks (**Figure 1**).

Post-sowing management

Post-sowing management included herbicide applications and grazing:

- ♣ 19/4/16: Spinnaker (400 ml/ha in 200-300 litres of water) to control broadleaf weeds.
- ♣ 3/5/16: Gallant Ultra (250 mL/ha in 200 L water with Uptake surfactant at 200ml/200L water/ha) to control grass species.



← Gate to paddock

Block 1

Row	Rep 1				Rep 2				Rep 3			
1	1. Antas	5. Leura	9. Antas	13. Leura	17. Antas	21. Leura						
2	2. Denmark	6. Napier	10. Denmark	14. Napier	18. Denmark	22. Napier						
3	3. Woogenellup	7. Monti	11. Woogenellup	15. Monti	19. Woogenellup	23. Monti						
4	4. Narrikup	8. Nomad	12. Narrikup	16. Nomad	20. Narrikup	24. Nomad						

Block 2

Row	Rep 4				Rep 5				Rep 6			
5	25. Nomad	29. Woogenellup	33. Nomad	37. Woogenellup	41. Nomad	45. Woogenellup						
6	26. Leura	30. Denmark	34. Leura	38. Denmark	42. Leura	46. Denmark						
7	27. Napier	31. Antas	35. Napier	39. Antas	43. Napier	47. Antas						
8	28. Monti	32. Narrikup	36. Monti	40. Narrikup	44. Monti	48. Narrikup						

Figure 1: Layout of clover cultivar plots at Rock Farm, Cave.

♣ 29/9 to 3/10/16 (after the second dry matter harvest): grazed with 590 merino hoggets.

Results

Weather

Since the start of the year there has been 500 mm of rainfall at Rock Farm (Figure 2). In February, June and September the monthly rainfall was less than 20 mm.

At Rural Fire's Cannington weather station, 4.5 km SSW of the experimental site, soil moisture levels have been as low as 8% (recorded in March 2016). The lowest recorded temperature there was -3.8°C in August 2016.

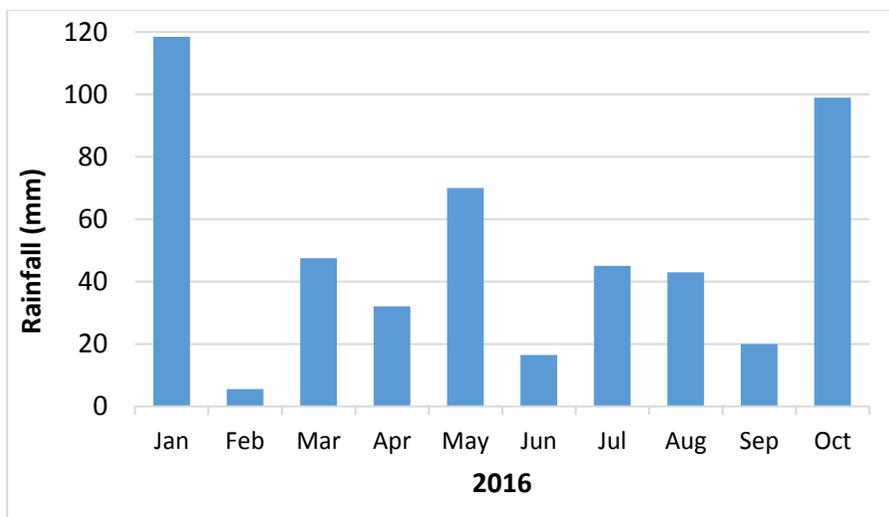


Figure 2: 2016 rainfall recorded at Rock Farm (data from Herstatt Ulrich).

Soils

Analysis of soil samples (0-75 mm depth) from the experimental site found:

- ♣ a pH of 5.5,
- ♣ Olsen P of 27 mg/L,
- ♣ potassium of 0.29 me/100g,
- ♣ calcium of 12 me/100g,
- ♣ magnesium of 2.0 me/100g,
- ♣ sulphate-sulphur of 67 mg/kg, and
- ♣ potentially available nitrogen of 135 kg/ha.

Establishment: % ground cover 13 weeks after sowing

The % of ground covered by sown clover in a 50 cm section of row was affected by cultivar ($p < 0.001$, **Figure 3**). Those sub cover cultivars with ground cover values greater than 80% were Antas, Narrikup, Leura and Woogenellup. Those with the lowest ground covers, less than 50%, were Monti and Napier.

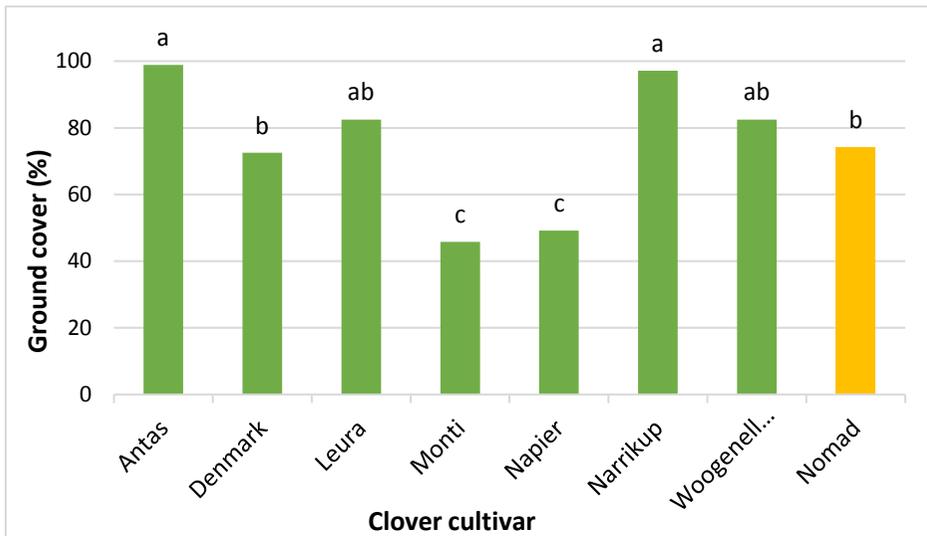


Figure 3: Effect of clover cultivar on the % ground cover, assessed, 13 weeks after sowing (8/6/16) at Cave. (Nomad white clover in yellow).

Sub clover dry matter production (preliminary results)

The results of the sub clover cultivar dry matter production (**Figure 4**) found:

- ♣ an average increase of 940 kg DM/ha from 20 to 26 weeks. The 20 week average of 475 kg DM/ha nearly increased four-fold to 1410 kg DM/ha at 26 weeks.
- ♣ Antas was the highest yielding sub clover cultivar at Cave. At 20 weeks Antas produced 1250 kg DM/ha and this increased to 3130 kg by 26 weeks. The next most productive sub clover cultivars were Woogenellup and Narrikup at 1610 and 1425 kg DM/ha at 26 weeks. These three cultivars exhibited good ground cover values at 13 weeks.
- ♣ While both Monti and Napier were low producing at 20 weeks (110 and 145 kg DM/ha) their production increased six-fold to produce 710 and 810 kg DM/ha by 26 weeks.

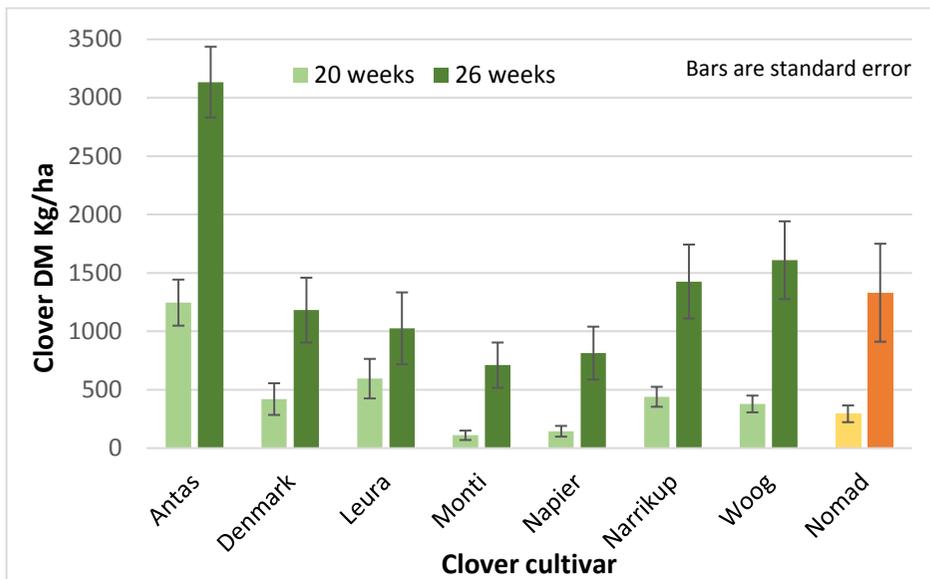


Figure 4: Dry matter production of sub clover cultivars from harvests at 20 weeks (31/7/16) and 26 weeks (11/9/16), Cave. (Nomad white clover in yellow).

Grass and weeds (preliminary results)

At 26 weeks the samples were sorted into clover, grass, other weeds, and dead material components (**Figure 5**). Grass plus weeds were only 10% of the DM in the Antas plots and 22% of the Denmark and Narrikup plots. The highest proportion of grass plus weeds was in the Monti plots at 57% and equivalent to 1050 kg DM/ha.

There were higher amounts of grass, particularly, and weeds in Block 2 of the experiment which was situated on the lower half of the slope (**Figure 6**). This was also observed early on in the experiment and prompted the application of post-sowing herbicides in an attempt to reduce grass and weed competition.

Location on the slope has not affected sub clover production.

As at other 'Sub 4 Spring' experimental sites, control of the grass and weeds competing with sub clover requires careful consideration and the role of herbicide application and timely grazing is being investigated.

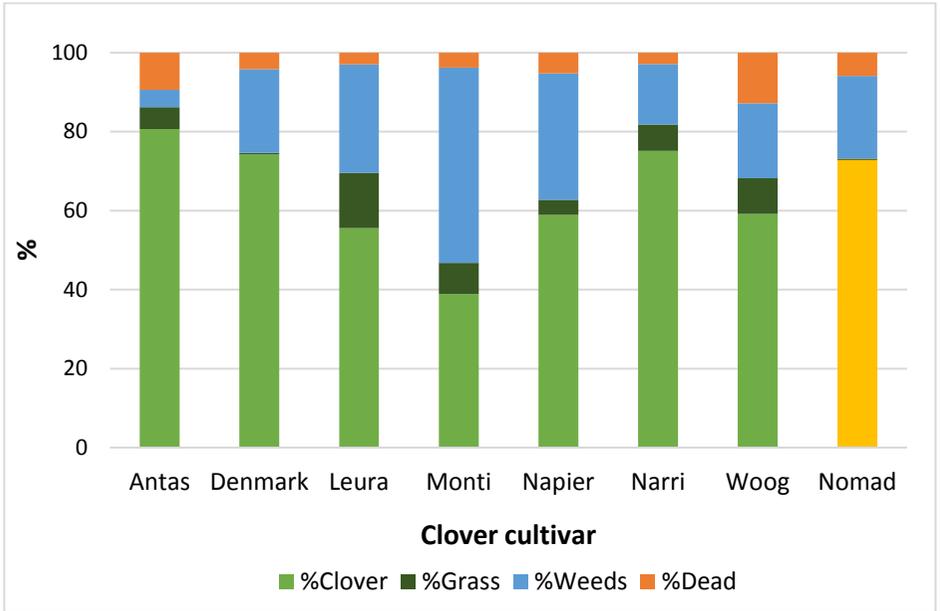


Figure 5: Components of herbage samples harvested at 26 weeks from the clover cultivar plots.

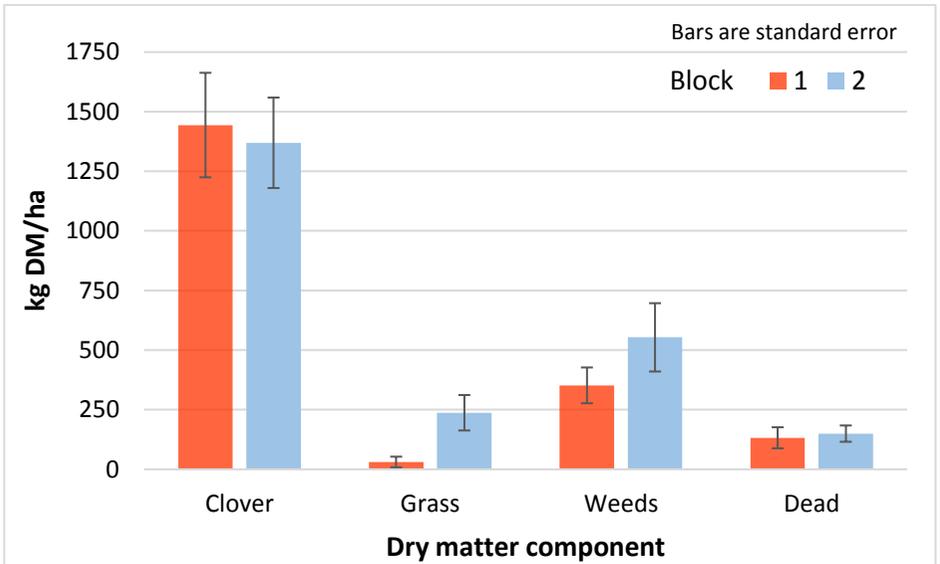
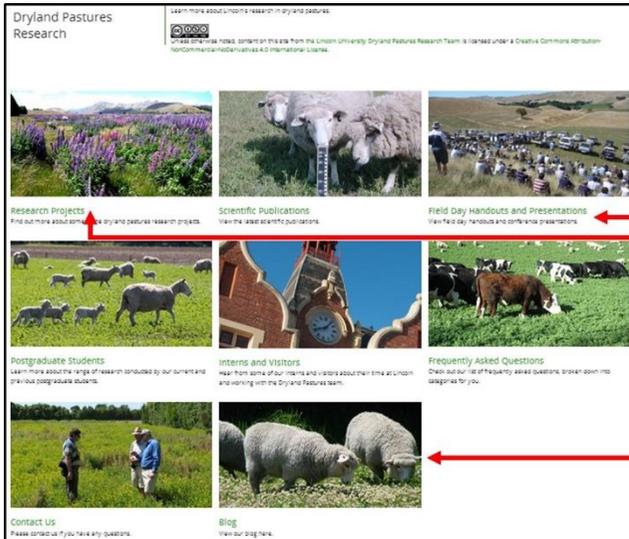


Figure 6: Effect of block on the amount of dry matter component at Cave. Block 1 was on the upper slope and 2 on the lower slope.

Website & Social Media

Website: www.lincoln.ac.nz/dryland



DPR website

Info on:

- Field Day presentations
- Current research projects (inc access to Maxcover Photo Diary)
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The DPR Team acknowledges the assistance of PLSC321 students Alvand Azimi, Tommy Ley, Connor Moorhead and Sam Whitley who undertook the dry matter harvests.