Project Number: 408090

Optimization of subterranean clover for dryland pastures in New Zealand

Sustainable Farming Fund 2016-2017

Ministry for Primary Industries
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Progress Report for Milestone M3764

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Lincoln University

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INTRODUCTION

During 2015 and 2016 14 experiments were established for the 'Sub 4 Spring' research programme across six dryland pastoral areas identified as being suitable for subterranean clover in New Zealand. The site selection for the research programme was outlined in the report for M3755 and the design and establishment of the experiments was described in the report for M3756.

The following table provides a summary of the site locations and the experiments that have been established and monitored at those sites.

Location	Experiment	Treatment(s)	No. plots
McKenzie Basin Omarama Station	1. Sub clover cold tolerance	14 sub clover cultivars + 4 other legumes (3 reps)	54
	2. Sub clover cold tolerance – effect of cocksfoot	3 sub clover cultivars + 2 other legumes (5 reps)	25
South Canterbury Rock Farm, Cave	Sub clover cultivars on clay soils prone to water logging	7 sub clover cultivars + 1 white clover (6 reps)	48
Mid Canterbury Iversen Fields, Lincoln	1. Sub Clover phenology	6 sub clover cultivars x 8 sowing dates (3 reps)	144
	2. Sub clover herbicide tolerance	14 sub clover cultivars + 3 other legumes x 3 herbicide treatments (3 reps)	153
Ashley Dene, Springston	1. Sub clover herbicide tolerance at 1-2 trifoliates	4 sub clover cultivars + 1 white clover x 10 herbicides (3 reps)	150
	2. Sub clover herbicide tolerance at 3-4 trifoliates	4 sub clover cultivars + 1 white clover x 10 herbicides (3 reps)	150
North Canterbury Koromiko Farm, Cheviot	1. Sub clover oversowing (paddock level)	4 sub clover cultivars x 10 pasture zones	NA
	2. Effect of lime on sub clover establishment	2 sites x 2 herbicide treatments x 3 lime treatments (3 reps)	36
Wairarapa Tokaroa Farm, Ponatahi	1. Management to increase resident sub clover - exclosure demo	6 exclosure transects + 6 paddock 'control' transects	12
	2. Sub clover cultivars	7 sub clover cultivars (2 reps)	14
Glenside Farm, Taratahi	Effect of herbicide on establishment of oversown sub clover	5 sub clover cultivars x 5 herbicide treatments (3 reps)	75
Hawkes Bay Poukawa Research Station	Sub Clover phenology	6 sub clover cultivars x 8 sowing dates (3 reps)	144
Waiau Station, Wairoa	Sub clover oversowing demonstration	5 sub clover cultivars oversown	NA

This report details evidence that Milestone 3764 of the 'Sub 4 Spring' research programme has been completed and includes an outline of:

- ♣ the date and type of data collected from each 'Sub 4 Spring' experiment during 'Year 1' at each location,
- ♣ photographs taken at the sites and how these were displayed on social media, and
- ♣ the management meeting.

A sub clover flower graces the Dryland Pastures Research 'Sub 4 Spring' page at http://www.lincoln.ac.nz/Lincoln-Home/Research/Current-Research/Dryland-Pastures-Research/Research-Projects/Sub-4-Spring/

DATA COLLECTION AND COLLATION

The following section is a summary of the data collected from all of the experiments during the first year of the research programme. For each experiment the date of the visit and the types of samples and data collected are described.

Across the experiments, data collection predominantly focussed on quantifying the effect of treatments (sub clover cultivar, herbicide, grazing, sowing date etc.) on:

- ♣ Established sown sub clover populations (i.e. plants/m^2), and
- ♣ Dry matter production during spring based on 2 to 3 separate harvests.

These datasets are complemented by soil nutrient data, seasonal environmental data, and visual scores e.g. ground cover, cold tolerance and vigour.

Those experiments that are a component of post graduate research projects have provided additional detailed datasets that are described in this report.

All of the data have been collated and stored on the secure Research 'R' drive at Lincoln University. Access to this drive is only available to those people working on the 'Sub 4 Spring' research project.

Counting sown sub clover plants on a heavily grazed slope with inset showing the amount of pasture remaining. Koromiko Farm, Cheviot, North Canterbury on 22/9/16. (Photo: Dick Lucas).

McKenzie Basin - Omarama

The experimental site is on Omarama Station owned and farmed by Richard and Annabelle Subtil.

Two Sub 4 Spring experiments were installed at this site on 18th February 2016:

- Expt 1 - cold tolerance of sub clover cultivars (60 plots including 13 sub clover cultivars and other legumes).
- Expt 2 - effect of interplanting with grass (cocksfoot) on the cold tolerance of sub clover cultivars (25 plots including 3 sub clover cultivars and other legumes).

Date	Data collected	Comment
31/03/2016	**Expt 1 & 2**	
	Establishment counts on a 50 cm section/plot	
	Photos: each 50 cm section	
	Expt 1 only	
	Plant samples with roots - 5 subs + HF + Red/rep	Data = Dry weights of shoots and roots, no. trifoliate leaves, root length
	Photos: Various of sampled plants	
	Soil samples: Rep 1 & 3: 0-75, 75-150 mm	4 Soil samples analysed
7/06/2016	**Expt 1**	
	Plants samples from 20 cm row section/plot	Data = No. plants, dry weights of shoots
	Score: Ground cover % 50 cm/plot	
	Score: Cold sensitivity/plot	
	Photos: each 50 cm section (also Expt 2)	
3/11/2016	**Expt 1**	
	Herbage sample – Quadrat/plot	
	Score: Ground cover % of vegetation/plot	
	Photos: each plot in rep 1 + others of site	
15/11/2016	**Expt 2**	
	Score: Ground cover % of vegetation	
1/12/2016	**Expt 1 & 2**	
	Herbage sample – Quadrat/plot	
	Score: Ground cover % of vegetation/plot	
	Score: Sub clover vigour	
	Sub clover runners (Expt 1)	From 6 cages in Rep 1
	Sub clover foliage samples	
	Photos: of each plot in Expts 1 and 2 and site	

Sub clover at Omarama Station, McKenzie Basin on 3/11/16. (Photo: Bridget Thomas).

South Canterbury – Cave

The experimental site is on Rock Farm which is owned and farmed by Herstall and Alyson Ulrich.

The objective of this experiment is to assess the survival and production of sub clover cultivars on clay soils prone to water logging. The experiment was sown on 3rd March 2016 using a commercial seed drill.

Notes:

- ♣ The experimental design included two blocks – one on the upper slope (B1) and one on the lower slope (B2). Due to a weed issue in B2, data collection on 8/04/16 was carried out on B1 only. All subsequent visits collected data from both blocks unless noted.
- ♣ The experiment was used by a group of PLSC321 students for their research project.

Date	Data collected	Comment
8/04/2016	Establishment counts on two 50 cm section/plot	Data collected from B1 only during this visit (see above)
	Score: trifoliate stage	
	Photos: each 50 cm section	
	Soil samples: 0-75, 75-150 mm	2 Soil samples analysed
8/06/2016	Plants samples from 20 cm row section/plot	Data = No. plants, dry weights of shoots
	Score: Ground cover % on two 50 cm/plot	B1 only
	Score: Cold sensitivity	General observation across the experiment
	Photos: of two 50 cm/plot	B1 only
31/07/2016	Herbage sample – Quadrat/plot	PLSC321 students – Visit 1
	Score: Cold sensitivity/plot	
	Rising Plate Meter measurements	
	Photos: various	
11/09/2016	Herbage sample – Quadrat/plot	PLSC321 students – Visit 2
	Photos: various	
4/11/2016	Herbage sample – Quadrat/plot	
	Photos: various	

PLSC321 students collecting data from the sub clover cultivar experiment at Rock Farm, Cave, South Canterbury on 11/9/16 (Photo: Sam Whitley).

Mid-Canterbury – Iversen Fields

Iversen Fields is on the Lincoln University Campus and two experimental sites that are part of the 'Sub 4 Spring' project are located in Iversen 1 and 2 behind the Field Research Centre.

Experiment site 1: Subterranean Clover phenology (Iversen 2)

This experiment is a component of Carmen Teixeira's PhD research programme. Detailed measurements of vegetative growth and reproductive development are being taken to assess how temperature and photoperiod affect sub clover plant development. This will allow a matching of sub clover cultivar to environment based on the duration of spring moisture supply and temperature regimes prior to summer drought. A validation study has been established at Poukawa Research Station in Hawkes Bay.

This experiment is based on six sub clover cultivars that were sown on eight dates from 24 June 2015 to 04 May 2016 (3 reps, 144 plots). So far this research has produced the following datasets:

- ♣ For each plot in each sowing date emergence counts were taken every two to four days from sowing date to final seedling population establishment (~ spade leaf phase).
- ♣ Phenological data (vegetative and reproductive stages) was collected twice a week on selected plants.
- ♣ Weather data collected daily.
- ♣ Seed maturity, burr and seed yield (buried and unburied seeds) and status (seed weight, hardness and germinability) were quantified as plants completed their life cycle (end of growth period). Visual scores of the plots re-establishment (second year) were also taken.

In addition photographs have been taken at regular intervals.

Sub clover phenology experiment on 11/2/16 (top) and 28/10/16 (bottom). Iversen Field 2, Lincoln University. (Photos: Anna Mills)

Newly emerged sub clover plants (left) and marking a sub clover plant at the spade leaf stage (right). Sub clover phenology experiment, Iversen Field 2, Lincoln University. (Photos: Carmen Teixeira)

A copy of Carmen's master data workbook and associated photos will be stored on the Lincoln University R drive on completion of her PhD project.

Experiment site 2: Subterranean clover herbicide tolerance (Iversen 1)

This experiment is part of Teresa Lewis's Masters research programme which is investigating the tolerance of sub clover cultivars to the herbicide Spinnaker (ai: imazethapyr) applied with and without the Sharpen (ai: saflufenacil). The other experimental site is at Ashley Dene.

The data collected includes:

- seedling counts of 1 m drill row in each plot on day 3, 5, and 7 and then weekly for a month,
- whole plot (144 plots) EWRS[1] score at 3, 5 and 7 days and then weekly, from April to September 2016,
- photos taken each time the plots were scored, and
- two harvests were carried out:

Date	Data collected	Comment
7-9/09/2016	Herbage harvest 1 – each plot	0.2 m^2 quadrat
25-27/10/16	Herbage harvest 2 – each plot	0.2 m^2 quadrat

[1] The European Weed Research Society (EWRS) has developed a phytotoxicity scoring system (1-9 scale) used to estimate actual weed infestation and assess the efficiency of herbicide applications.

Mid-Canterbury – Ashley Dene

Ashley Dene is a Lincoln University owned farm near Springston, Canterbury.

At this site there are two experiments that are investigating the herbicide tolerance of subterranean clover cultivars at two stages of seedling development:

- ♣ Herbicide treatments applied at the 1-2 trifoliate leaf stage (Expt 3[2]).
- ♣ Herbicide treatments applied at the 3-4 trifoliate leaf stage (Expt 4).

These experiments are part of Teresa Lewis's Masters research programme and for both experiments the following datasets have been collected:

- ♣ seedling counts of 1 m drill row in each plot (150 in each experiment) on day 3, 5, and 7 and then weekly for a month,
- ♣ weekly, from April to September 2016, all of the plots were EWRS scored and photos were taken, and
- ♣ two harvests were carried out:

Date	Data collected	Comment
11-16/09/2016	Herbage harvest 1 – each plot	Both experiments, 0.2 m^2 quadrat
9-11/11/16	Herbage harvest 2 – each plot	Both experiments, 0.2 m^2 quadrat

This experiment was used by a group of PLSC321 students for their research project.

A copy of Teresa's master data workbook and associated photos will be stored on the Lincoln University R drive on completion of her Masters project.

Collecting herbage samples from a sub clover cultivar x herbicide experiment at Ashley Dene, Mid Canterbury, on 10/11/16 (Photo: Shelby Filley).

[2] There are four experiments in the herbicide x sub clover cultivar research undertaken by the Master's student.

North Canterbury – Cheviot

The experimental site is on Koromiko Farm, in the Lowry Hills Range about 15 km west of Cheviot, which is owned and farmed by Hugh Crossley.

Two experiments at this site are part of the 'Sub 4 Spring' research programme and are a component of Gracie Woolsey's Master's research programme:

- ♣ Experiment 1: Subterranean clover oversowing
- ♣ Experiment 2: Effect of rate of lime application on sub clover establishment

Date	Data collected	Comment
22/09/2016	Expt 1: Sub clover counts in 10 pasture zones	0.5m^2 quadrats used
	Expt 2: Sub clover counts at two lime plot locations	"
	Photos: various	Of lime plots and pasture zones
28/11/2016	Expt 2: Ground cover scores and botanical snip samples	From two treatments – 0 and 4 tonnes of lime /ha
20/12/2016	Expt 1: Two x 20 m transects to assess ground cover and evaluate grass species in each pasture zone	At 2 m intervals

A copy of Gracie's master data workbook and associated photos will be stored on the Lincoln University R drive on completion of her Masters project.

Pasture zone 'Pasture and tussock slope' a) 0.5m^2 quadrat showing predominance of brown top and white clover, and b) 0.5m^2 quadrat and enlarged inset showing an oversown Antas cultivar of sub clover. 22/9/16, Koromiko Farm, Cheviot, North Canterbury. (Photo: Dick Lucas)

Wairarapa - Ponatahi

Tokaroa Farm, owned and farmed by Dan and Reidun Nicholson, which is located on Ponatahi Road north-east of Martinborough, hosts two 'Sub 4 Spring' experiments:

- ♣ Experiment 1: Management to increase resident subterranean clover - exclosure demo.
- ♣ Experiment 2: Sub clover cultivars – suitability for introduction into pasture by direct drilling.

'On-Farm Research' were involved in the management and sampling of both of these experiments.

Experiment 1: Exclosure demo

This experiment started in September 2015 and there are now two seasons of data. After the 2015 season the design of the experiment was changed to increase replication and refocus the data collection techniques so that increased resident sub clover growth was more effectively monitored.

2015

Date	Data collected	Comment
20/10/2015	4 herbage cuts from exclosure 2 5 herbage cuts from the paddock Photos: series from exclosure points	0.2 m^2 quadrat Cages placed
07/11/2015	4 herbage cuts from exclosure 3 5 herbage cuts from the paddock Photos: series from exclosure points	0.2 m^2 quadrat From under cages
30/11/2015	4 herbage cuts from exclosure 1 5 herbage cuts from the paddock Photos: series from exclosure points	0.2 m^2 quadrat From under cages

2016

Date	Data collected	Comment
4/06/2016	Establishment counts	Plants with true trifoliate leaves
29/09/2016	12 transect lines assessed 7 herbage cuts from the paddock Photos: various	0.1 m^2 quadrat assessed at each point From under cages placed 4/6/16
16/10/2016	Bulk soil sample 0-75 mm	For analysis, results on file
26/10/2016	12 transect lines assessed Photos: various	0.1 m2 quadrat assessed at each point
25/11/2016	12 transect lines assessed 8 herbage cuts from the paddock 4 Sub clover foliage samples Photos: various	0.1 m2 quadrat assessed at each point From under cages placed 4/6/16 Healthy and non-healthy, for nutrient analysis

Experiment 2: Sub clover cultivars

Date	Data collected	Comment
04/06/2016	Establishment counts	Plants with true trifoliate leaves
11/08/2016	Score: Ground cover	Sub clover, grass, weed bare ground
29/09/2016	Herbage sample/plot Photos: various	0.18 m^2 quadrat
05/11/16	Herbage sample/plot	0.12 m^2 quadrat

Wairarapa – Taratahi

This 'demo' experiment on Glenside Farm, which is a Taratahi Agricultural Training Centre training farm on the Martinborough - Masterton Road, has been managed by Annette Litherland, a tutor at the training centre.

A range of photos have been taken during site visits by Malcolm Macfarlane (On-Farm Research), Annette Litherland (Taratahi Agricultural Training Centre) and Dick Lucas and Sonya Olykan (Lincoln University).

At this site 75 plots were installed. Where good establishment of the sown sub clover cultivars occurred, cages were placed for herbage cuts to be taken. Resident sub clovers also proved to be of interest at this site.

Date	Data collected	Comment
26/11/2015	Photos: pre-spring herbicide application	General site photos
09/05/2016	Score: herbicide on ground cover	% green, % dead and % open ground
28/06/2016	Establishment counts	10 quadrats/plot (75 plots)
30/9/16	Photos: general of site	
05/11/16	Herbage sample/cage	26 cages across the experiment were sampled

Sorting herbage samples requires a lot of patience and person-hours not to mention some good music in the background. Above: people sort sub clover samples at the FRC, Lincoln University. (Photo: Teresa Lewis).

Hawkes Bay – Poukawa

Subterranean Clover phenology – validation site

The experimental site is hosted by On-Farm Research and is a component of Carmen Teixeira's PhD research programme. Noel Smith (On-Farm Research) is managing and maintaining the experiment.

This experiment is similar to the one in Iversen 2 at Lincoln University: 6 sub clover cultivars planted on 8 sowing dates from 19 February 2016 with the last sowing on 5 January 2017 (3 reps, 144 plots). The following data have been collected:

- ♣ Phenological data (vegetative and reproductive stages) is collected twice a week on selected plants.
- ♣ Visual plot performance undertaken twice when plants had approximately 3-5 trifoliate leaves and then when they have 8-10 trifoliate leaves.
- ♣ Herbage harvest on 27th October 2016 - 1 rep of each sub clover cultivar from four sowing dates.

Top: irrigating newly established sub clover plots in sowing date 7 on 2/12/16. Below: senescence of older sub clover sowing dates on 6/1/17 (bottom). Poukawa Research Station, Hawkes Bay (Photos: Noel Smith).

Hawkes Bay – Wairoa

This on-farm demonstration site is on Waiau Station that is owned and farmed by Dave Read and Judy Bogaard.

The demonstration area, known as 'Craig's Trig', was oversown with sub clover in March 2016 by Dave Read and is being used in an advisory capacity for the farmer initiated Wairoa Discussion Group.

Dave Read wrote a diary about his experiences. This was included in the booklet, produced for the field day held at Waiau Station on 9th November 2016, along with photos Dave took of the site (e.g. cattle grazing) and plants dug up to represent 'good' specimens and 'average' specimens of sown sub clover compared to a resident sub clover specimen (see below).

There have been no formal collections of experimental data from the demo area. There is a file of monthly rainfall data provided by Dave.

Sown and resident sub clover plants sampled on 28/8/16 from the Craig's Trig demonstration area, Waiau Station, Wairoa, Hawkes Bay. (Photo: Dave Read).

PHOTOGRAPHS

Digital copies of photographs taken at the Sub 4 Spring experimental sites are stored on a secure drive at Lincoln University. These photos include:

- ♣ general site
- ♣ close ups of pre-determined locations in individual experimental plots
- ♣ impact of treatments at plot, plant and leaf level
- ♣ individual sub clover cultivars showing a range of characteristics
- ♣ harvested sub clover plants
- ♣ people working on the experimental sites and processing samples at the university
- ♣ events such as field days (see report for Milestone M3765)

Photographs from the experiments have been put on the Dryland Pasture's Facebook page and website as well as distributed in the various booklets produced for the 'Sub 4 Spring' field days held during October and November 2016.

A number of the photos taken were used on the Dryland Pastures Website and Social Media outlets. In all of the field day booklets the following was included to encourage those with an interest in dryland pasture farming to connect to the latest information on the internet:

Website & Social Media

- Website: www.lincoln.ac.nz/dryland

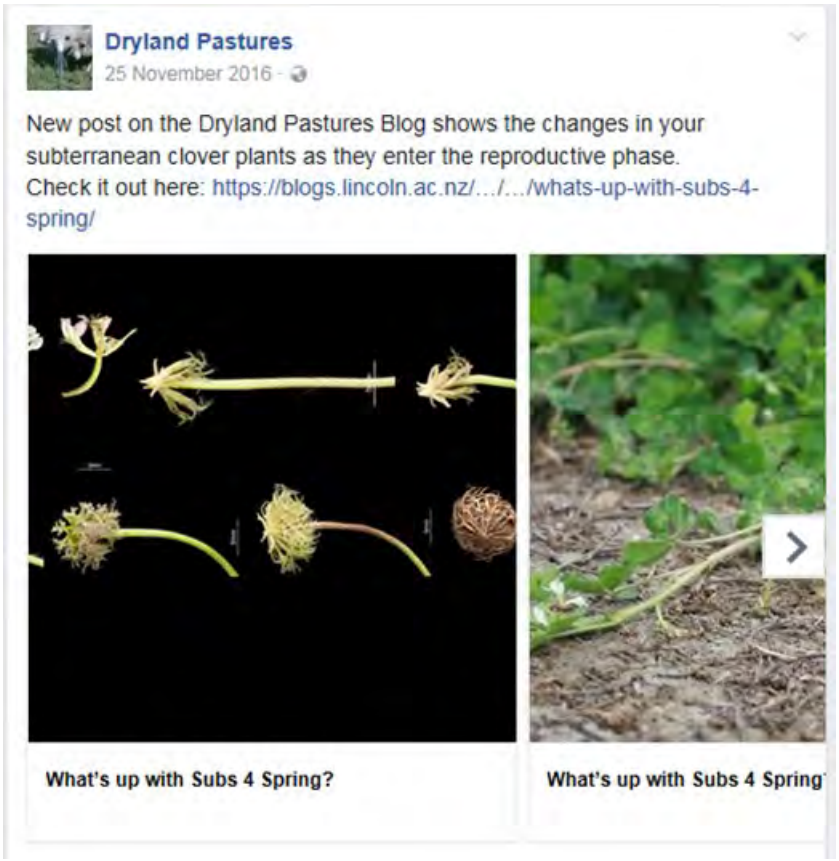
- Blog: https://blogs.lincoln.ac.nz/dryland/
- Facebook: @DrylandPasturesResearch
- YouTube: https://www.youtube.com/DrylandPastures

Facebook

The Dryland Pastures Research (DPR) Facebook page - which can be found at www.facebook.com/DrylandPasturesResearch/ - currently has 258 likes. The following are examples of recent 'Sub 4 Spring' posts.

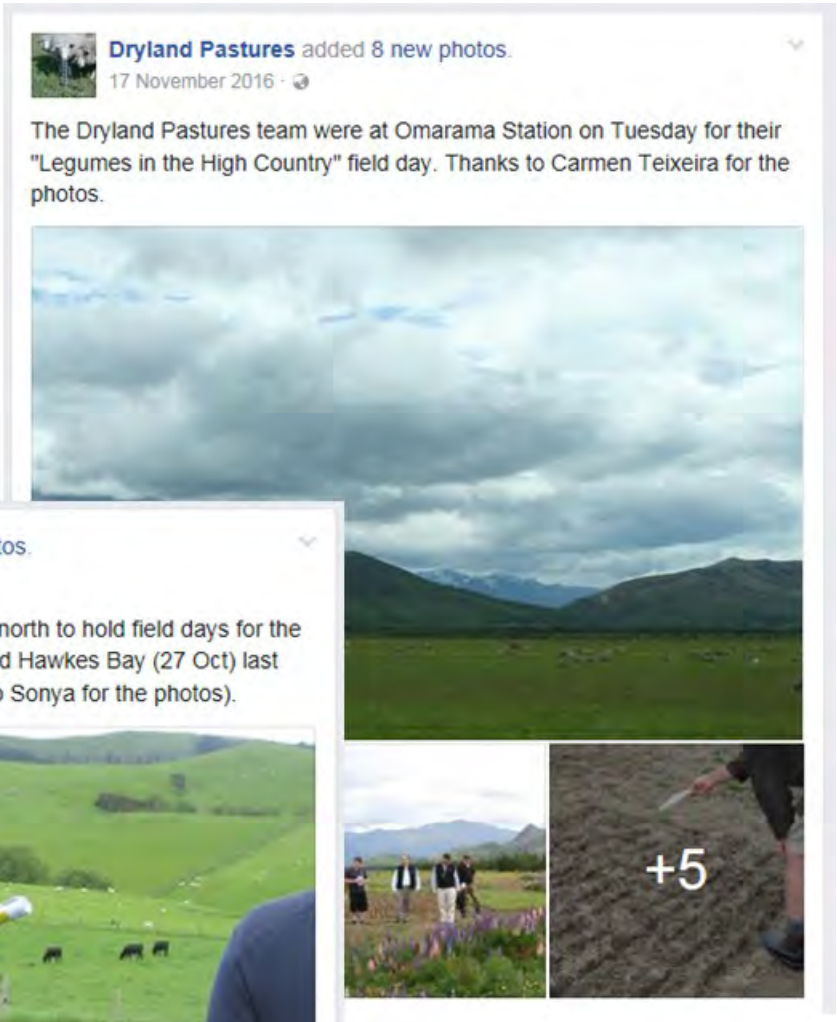
The latest post (12/1/17) is a photo of the Sub Clover Phenology validation site at Poukawa Research Station, Hawkes Bay:

This post (25/11/16) took viewers to the blog:



The Sub 4 Spring Field Days offered great photo opportunities.

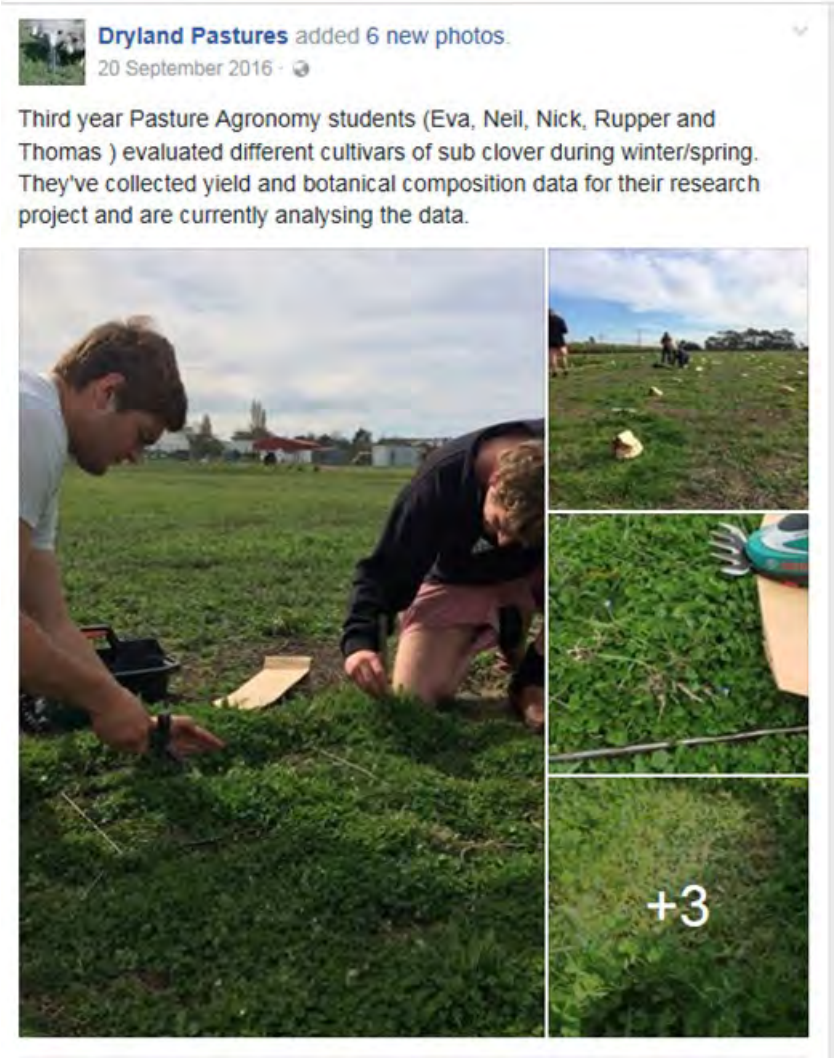
- 17/11/16 post included photos from the field day at Omarama Station
- 1/11/16 post covered the Wairarapa and Hawkes Bay field days
- 14/10/16 post of the first field day at Ashley Dene



The following post (14/10/16) highlighted that the first edition of the 'Guide of subterranean clover identification and use in New Zealand' (Milestone 3779) could be downloaded from the DPR Sub 4 Spring section of the website and provided the link for this:

This post (21/9/16) advertised the first Sub 4 Spring field day:

Facebook posts, like this one on 20/9/16, promoted the importance of existing research programmes, like 'Sub 4 Spring', for providing opportunities for Lincoln University Pasture Agronomy (PLSC321) students to undertake their own research projects on existing experiments:



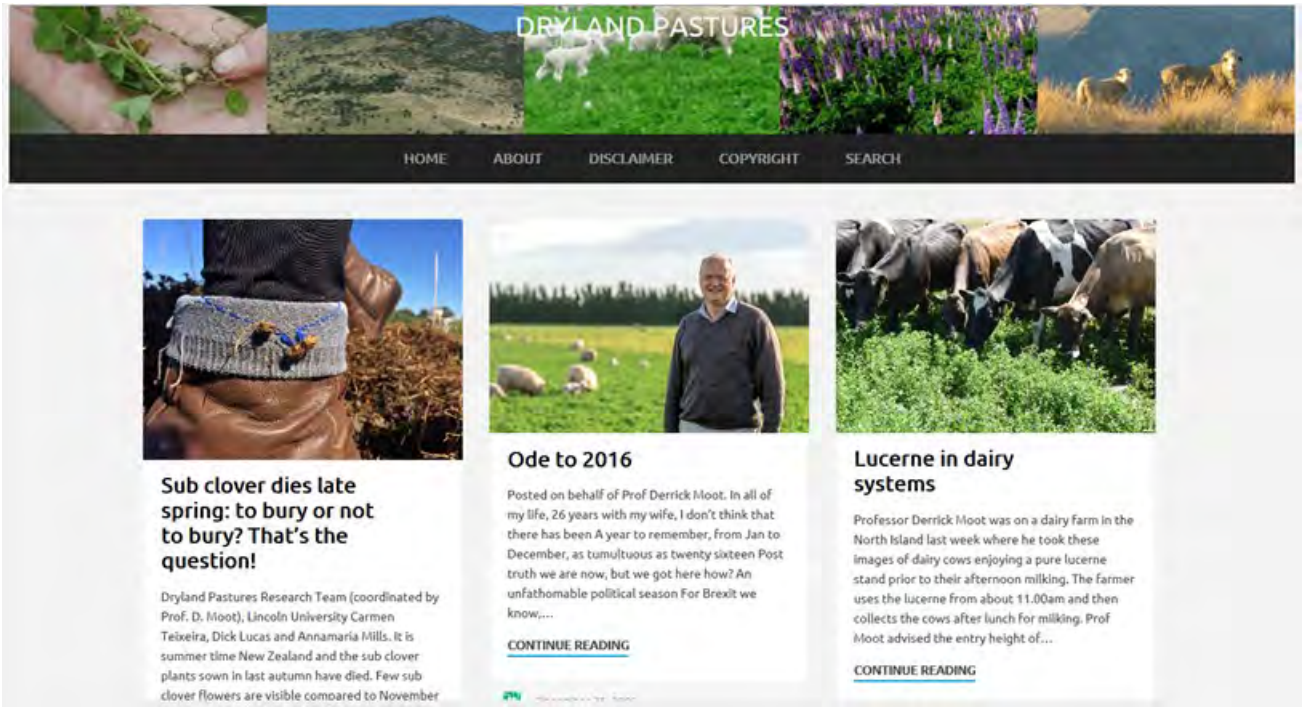
Earlier 'Sub 4 Spring' posts:

- 16/9/16: photos of PLSC321 students working in 'Sub 4 Spring' experiment at Iversen Fields, Lincoln University
- 6/9/16: photos of Sub 4 Spring experiment at Poukawa Research Station, Hawkes Bay
- 2/9/16: photos of PLSC321 students working in 'Sub 4 Spring' experiment at Cave, South Canterbury
- 17/8/16: photos of B+LNZ Forage Profit Partnership Field Day – sub clover briefly discussed
- 12/7/16: footage of a drone flight over 'Sub 4 Spring' experiment at Iversen Fields, Lincoln University
- 17/6/16: photos from visit to Omarama and Cave 'Sub 4 Spring' experiments

Blog

The following 'Sub 4 Spring' articles, including photographs, are on the DPR Blog which can be found at https://blogs.lincoln.ac.nz/dryland/ :

- ♣ 27/11/16: Sub clover dies late spring: to bury or not to bury? That's the question!
- ♣ 25/11/16: What's up with Subs 4 Spring?
- ♣ 14/10/16: NZ Subterranean clover guide available now
- ♣ 21/9/16: Dryland Pastures Field Day
- ♣ 5/8/16 Effects of Herbicides on subterranean clover



Screen shot of the DPR Blog page (taken 27/1/17)

YouTube Channel

In addition videos produced by the Dryland Pastures Research team are uploaded for viewing on the DPR YouTube channel https://www.youtube.com/DrylandPastures. The channel currently has 120 subscribers.

The following videos relate to the 'Sub 4 Spring' project:

- ♣ Herbicides on subterranean clover (Parts 1 to 4)
- ♣ Cocksfoot pasture with sub clover viewed on 26 August
- ♣ Dryland Pastures – Cocksfoot and Sub clover pasture

‘SUB 4 SPRING’ MANAGEMENT MEETING

Date: Tuesday 20th December 2016

Venue: FRC Office 104

Time: 2 – 3.30 pm

Participants: Derrick Moot, Dick Lucas, Sonya Olykan, and Carmen Teixeira.

Objective: to discuss the ‘Sub 4 Spring’ research programme for the coming year (2017).

Agenda items

- ♣ SFF408090 milestones due in 2017
- ♣ Proposed work to be carried out at each experiment in 2017

Discussion

Future SFF408090 milestones

M3764 (due 31/1/17)

Work has begun on the collation and storage of the data files from all of the ‘Sub 4 Spring’ experiments for this milestone.

Gracie Woolsey is finalising the data from the most recent harvests from the Omarama, Cave, Ponatahi and Taratahi sites. Also waiting for data from Paul Muir (On-Farm Research) relating the cage cuts from the exclosure experiment at Ponatahi.

AP: Follow up with Gracie and Paul re. getting all of the data - Sonya Olykan.

M3767 (due 30/6/17)

Some data analysis has already been undertaken for the work presented in the field days booklets.

M3769 (due 31/06/18)

Looking ahead it was noted that the work for this milestone, ‘Photo-diary of growth and development of sub clovers sub species at representative sites’ should be started during the coming growing season. The following points were discussed:

- ♣ Three ‘representative’ sites for this work would be Omarama, Lincoln and a North Island site.
- ♣ Consider looking at cultivated versus oversown sub clovers
- ♣ Lincoln site in Iversen Field 2 – this will require weed control in early February to allow regeneration of the sub clovers.

AP: Develop a protocol for this work - Sonya Olykan.

Proposed work to be carried out at each experiment in 2017

Omarama – McKenzie Basin

2017 maintenance and work will focus on:

- ♣ toward the end of January the site will require a clean-up graze.
- ♣ establishment counts, most likely in April

- ♣ sub clover root growth in relation to soil Al levels
- ♣ dry matter harvests in October/November

Dick noted that he may have the opportunity to visit the site in January but if this didn't eventuate we should contact Bill Gordon and get an update on the status of the experiments.

AP: contact Bill Gordon re. experimental site - Sonya Olykan.

AP: contact Richard Subtil re grazing in January – Dick Lucas.

Cave – South Canterbury

This site had weed issues last season and it would be good to get on top of this. The following schedule of maintenance and research work was decided:

- ♣ graze with cattle in January once the clovers have died off
- ♣ apply round up across the plots in early February – ask Herstall to do this
- ♣ establishment counts in April
- ♣ late April look at applying Headstart herbicide at the two-leaf stage to control broadleaf weeds
- ♣ schedule Year 2 DM harvests for August, October and November.

AP: contact Herstall Ulrich re. grazing and herbicide application – Sonya Olykan.

Ashley Dene – Mid Canterbury

Teresa's sub clover cultivar x herbicide experiments – should they be continued? What would be the best treatments/experiment to focus on? There was a herbicide effect on flowering.

Meeting discussed the following:

- ♣ Round-up the area to control weeds.
- ♣ Carry out establishment counts in April post rain

AP: herbicide application – Dave Jack in February/March after rain.

AP: contact Teresa and ask her which herbicide treatment stage was the most effective (2 or 4 leaf stage) and which experiment in which to manage re-establishment if we could only choose 1 – Sonya Olykan.

Iversen Fields – Lincoln – Mid Canterbury

Iversen 1 - Herbicide experiment has served its purpose and will be abandoned. Area should be deep ploughed.

Iversen 2 - It has been a good season for sub clover growth and there is an indication that the growth of sub clover cultivars can be described as determinate or indeterminate. Which cultivars are determinate v indeterminate? If the season allows continued growth do the indeterminate cultivars 'kick-on'? Is it possible to score for this?

AP: Organise Iversen 2 weed control for February as the site will be used for the photo diary – Dave Jack

Cheviot – North Canterbury

Have an on-site meeting with the farmer, Hugh Crossley, to look at the research programme for the coming year.

AP: Organise meeting – Derrick Moot

Ponatahi - Wairarapa

Exclosure demo site:

- ♣ needs to be grazed – contact Dan to organise this
- ♣ measure re-emergence in April
- ♣ Waratahs have been left up in case areas could be used again

Sub clover cultivar site – what has happened to this since the last DM harvest?

AP: contact Dan re both experiments - Sonya Olykan.

Taratahi – Wairarapa

The sub clover x herbicide experiment has been completed. Look at expanding this work into a case study on a large demo area. To facilitate this, visit Annette Litherland, Taratahi Agricultural Training Centre, in February/March.

AP: organise a meeting with Annette in February/March – Sonya Olykan/ Dick Lucas.

Poukawa – Hawkes Bay

Carmen reported that the last sowing date would be in early January.

The herbage needs to be removed from the site.

Question about looking at sub clover cultivar seed yield and re-emergence.

AP: Investigate possibility of a trip to Poukawa to measure seed yield and organise grazing – Carmen Teixeira.