

# Future Forage Systems Project

## Annual Clover Hub Notes Okawa, 7<sup>th</sup> August 2013

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### *Future Forage Systems - Background*

The East Coast Future Forage Systems Project provides the opportunity to road-test a range of forage technologies such as lucerne, plantain and annual clovers – both as crops and on hill country. Where possible, this will consist of on-farm demonstrations where new options are benchmarked against existing farm practice. Once we understand how these alternatives perform locally, we can look at integrating them into farming systems.

The focus at Okawa is to understand the establishment and management of annual clovers as a high quality lamb feed and for optimising seed set

## *Upper Grove – 8.8 ha*

### *Objective:*

- Evaluate establishment of Arrowleaf and Persian clovers on summer dry flats.
- Obtain season production under dryland Hawke's Bay conditions.
- Measure seed set and hard seededness of annual clovers following different closing dates.
- Monitor regeneration from seed bank (over several seasons).

### *Treatments*

#### **Cultivation**

- Spray, summer fallow & cultivate (two passes of spring tyne cultivator)
- Spray, summer fallow & direct drill
- Spray, summer fallow & broadcast

Note – it was intended to double spray, with a second spray prior to sowing but the second spray was not applied because there was little live vegetation at sowing.

#### **Seed Mixes**

1. 12 kg/ha 'Arrotas' Arrowleaf clover – deep tap root well suited to summer dry
2. 12 kg/ha 'Bolta' Persian clover – tolerates waterlogging
3. 12 kg/ha 'Arrotas' Arrowleaf clover + 12 kg/ha 'Bolta' Persian clover

#### **Closing Dates** - Three closing dates to look at seed production using cages (2m \* 2 m)

- early October
- early November
- early December

### *Measurements*

- Plant establishment
- Dry matter production compared to nearby paddocks
- Animal weights on and off and number of grazing days
- Number of seed heads, seed set and percentage of hard seeds

### *Timeline*

- **5 April 2013** – Cultivated and Sown
- **23 April 2013** – Checked for weeds - There are a few broadleaf weeds, mainly mallow and grass species mainly bromus species
- **3 May 2013** – Checked for weeds. Arrowleaf clover had advanced to 1 – 3 trifoliate leaves. Persian clover was still slower at 1 – 2 very small trifoliate leaves. Conditions are extremely dry and compromising establishment (Noted cotyledons were dieing + some first true leaf). Grass (mostly) and weed competition advancing.
- **15 May 2013** – Sprayed 250 ml/ha Crest (Galant) and 1 litre/ha Bonza, 3 litres/ha Troy (Basagran), 1 litre/ha Lorsban (all in 125 litres/ha).
- **6 June 2013** – Plant establishment counts made
- **23 June 2013**
- **25 June 2013** – Slug bait applied to all areas of Persian clover (SlugOut)

Figure 1 – Trial site layout

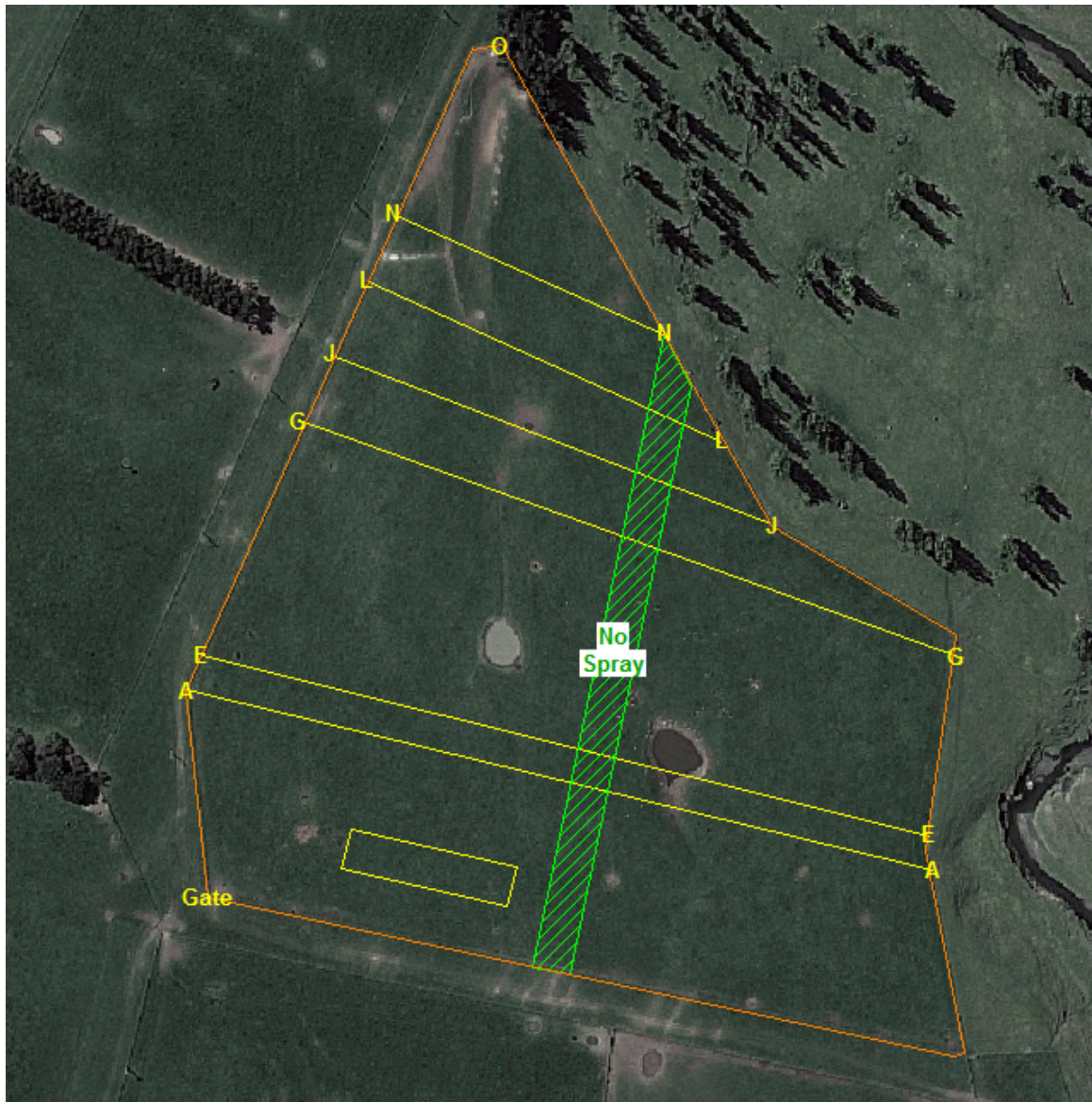


Table 1 – Layout and treatments in inset trial area

Width		
2.9 m	No Seed	Direct drill Persian
2.9 m		Broadcast Persian
2.3 m	Direct Drill Arrowleaf	
7.6 m	Broadcast Arrowleaf	

Towards Track

**Table 2 – Paddock treatments**

Peg	Widths	Drill/Broadcast	Ground Treatment
<b>O</b>			
	Many	Persian	Uncultivated - direct drill
<b>N</b>			
	Many	Persian	Uncultivated - broadcast
<b>M</b>			
		Direct Drill Arrowleaf 12 kg/ha (buffer)	Uncultivated - broadcast
<b>L</b>			
	Many	Persian 12 kg/ha	Uncultivated - broadcast
<b>K</b>			
		Direct Drill Arrowleaf 12 kg/ha (buffer)	Uncultivated - direct drill
<b>J</b>			
	Many	Arrowleaf 12 kg/ha	Uncultivated - broadcast
<b>I</b>			
	2	Broadcast & Cultivated Arrowleaf 12 kg/ha	Uncultivated - broadcast
<b>H</b>			
	1	Broadcast Arrowleaf 12 kg/ha	Uncultivated - broadcast
<b>G</b>			
	Many	Arrowleaf @12kg/ha	Uncultivated - direct drill
<b>F</b>			
	1	Broadcast Arrowleaf 12 kg/ha	Uncultivated - broadcast
<b>E</b>			
	3	Direct Drill Arrowleaf 12 kg/ha plus one double drilled width (un pegged)	Uncultivated – direct drill
<b>D</b>			
	1	Direct Drill Persian 12 kg/ha	Uncultivated – direct drill
<b>C</b>			
	3	Direct Drill Arrowleaf 12 kg/ha	Uncultivated direct drill
<b>B</b>			
	1	Broadcast Persian 12 kg/ha	Uncultivated
<b>A</b>			
	Many	Arrowleaf @12kg/ha	Double cultivate - direct drill
<b>Gate</b>			
Track			

## **Results:**

**Plant establishment** – In May it became evident that there were seedling establishment issues in parts of the paddock and areas of the southern are appeared to have suffered from an insect attack. Northern parts of the paddock were largely OK. There was also a very good strike of weed and grass seedlings after the late autumn rains. Grass weeds were sprayed on the 15th May with 250 ml/ha Crest (Galant) and 1 litre/ha Bonza, 3 litres/ha Troy (Basagran) all in 125 litres/ha. In addition an insecticide (Lorsban) was added at 1 litre/ha. An unsprayed control strip was left in the middle of the paddock.

Seedlings establishment or percentage of ground cover by clover was measured on 6 June 2013 in the small trial plots. There were large differences between direct drilled and broadcast plots, with 4-5 times more plants establishing by drilling than by broadcasting (Table 3).



Seedling counts (Table 4) and percentage of clover cover scores (Table 5) were carried out for all paddock treatments. Whilst there was a wide range between treatments, establishment was far higher in the northern part of the paddock for all treatments.

**Table 3 – Seedling counts in the trial area 8 weeks from sowing**

Plot	Clover	Treatment	Seedlings per m <sup>2</sup>
V	Persian	Direct drill	160.6
W	Persian	Broadcast	42.7
X	Arrowleaf	Direct drill	209.1
Y	Arrowleaf	Broadcast	42.5

**Table 4 – Seedling counts by establishment technique 8 weeks from sowing**

Plot	Clover	Cultivation		Paddock	Seedlings /m <sup>2</sup>
Gate	Arrowleaf	Tyne	Drilled	North	21.1
Gate	Arrowleaf	Tyne	Drilled	South	11.3
Gate	Arrowleaf	Tyne	Drilled	No Spray	28.0
A	Persian	None	Broadcast	North	54.5
A	Persian	None	Broadcast	South	24.7
A	Persian	None	Broadcast	No Spray	39.3
E	Arrowleaf	None	Broadcast	North	33.7
E	Arrowleaf	None	Broadcast	South	7.0
E	Arrowleaf	None	Broadcast	No Spray	6.7
Gate	Persian	Tyne	Drilled	North	21.6

**Table 5 – Clover cover (%) by establishment technique 8 weeks from sowing**

Plot	Clover	Cultivation	Sowing	Paddock	% Cover
B	Arrowleaf	None	Drilled	North	16.1
B	Arrowleaf	None	Drilled	South	16.1
B	Arrowleaf	None	Drilled	No Spray	18.3
C	Persian	None	Drilled	North	20.0
C	Persian	None	Drilled	South	6.5
C	Persian	None	Drilled	No Spray	14.4

**Insects.** Large areas of the southern side of the paddock appear to have been subjected to an insect attack shortly after germination. The damage was severe and complete in large patches before it was noticed. No insects were evident when examined though we suspect red legged earth mite.

**Slugs.** Slug damage was evident on Persian clovers only in early July. The main effect is irregular chunks of leaf missing on one or more of the trifoliate leaf. Slug eggs were evident in the soil around plants. Slug bait (SlugOut – 18g/kg metaldehyde) was applied at 6 kg/ha to all Persian clover areas together with a 4 metre buffer either side.

**Ducks.** Paradise duck have been preferentially grazing much of the small areas of Persian clover. As they have concentrated in small areas quite a bit of foliage has been removed. Often all 3 trifoliate leaves have been removed, leaving behind only the petiole only. If a larger area had been sown the

effect would likely be far less pronounced (unless more ducks arrived). Overall it does not appear that that the plants have suffered too much as it appears they are growing laterally whilst being grazed.

### *Lessons/observations to date:*

- Spray/fallow initially very successful, but there was a major strike of weeds and annual grasses following rains. Should sowing be delayed until after rain and when first strike of weed seeds has occurred?
- Incorporation of a broad spectrum herbicide with a pre-sowing spray would be beneficial. Lorsban is compatible with Roundup.
- Annual clover seedlings are very susceptible to competition during establishment.
- Regular monitoring for insects and rapid application of insecticide is necessary.
- Application of herbicides to control emerging weeds and grasses was very effective
- Direct drilling was superior to broadcasting seed and direct drilling into cultivated ground was more successful than direct drilling into unprepared ground.

### *Discussion points:*

- Cultivation/establishment techniques
- Managing for seed set – can we achieve a permanent crop. Will sowing some un-scarified seed help with future sowings in subsequent years.
- Management for optimising animal performance

**Figure 2 – Arrowleaf (left), Persian (right)**



**Figure 3 – Slug damage on Persian clover**

