

# Future Forage Systems Project

## Plantain Hub Notes Te Mahanga, 27<sup>th</sup> July 2013

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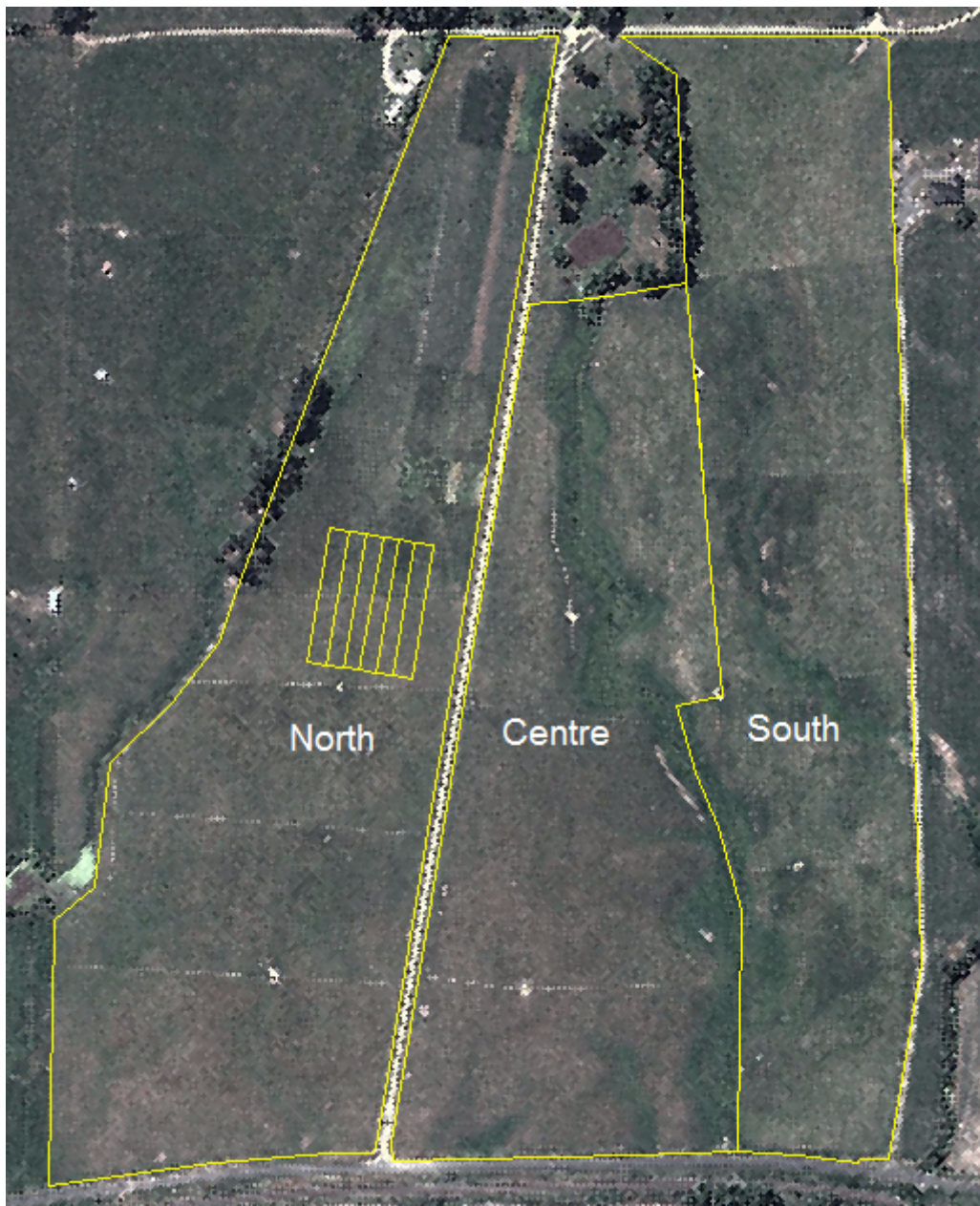


### *Future Forage Systems - Background*

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 Te Mahanga is to provide high quality feed for winter/spring lamb finishing

**Figure 1. Paddock layout and trial plot location**



### *Te Mahanga – 40.1 ha*

#### ***Objectives:***

1. Evaluate production and animal performance (lamb growth) on plantain/clover
2. Evaluate role of annual clovers with plantain under grazing
3. Develop management systems for annual clover re-seeding

#### ***Establishment***

The area was in annual ryegrass for the previous two years. On in early December 2013 cultivation commenced with spraying out of resident pasture (see timeline for full establishment details).

### *Fertiliser*

- **February 2013** - Lime application: Centre(pH 5.1) & South(pH 5.2) had agricultural lime 6 t/ha, North (pH 5.5) received 4 t/ha agricultural lime
- **Pre drilling April 2013** - Central & South 125kg/ha DAP, North Cropmaster 20 (N (19.3%), P (10%) & S (12.5%) at 125kg/ha

### *Seed*

#### **Base mix**

- 6 kg/ha Tonic Plantain
  - 3 kg/ha "Tuscan" Red clover
  - 3 kg/ha 'Bolta' Balansa clover
  - 3 kg/ha "Lightning" Persian clover
  - 1.5 kg/ha 'Nomad' White clover
  - 1.5 kg/ha 'Tribute' White clover
- Total 18 kg/ha**

### *Timeline*

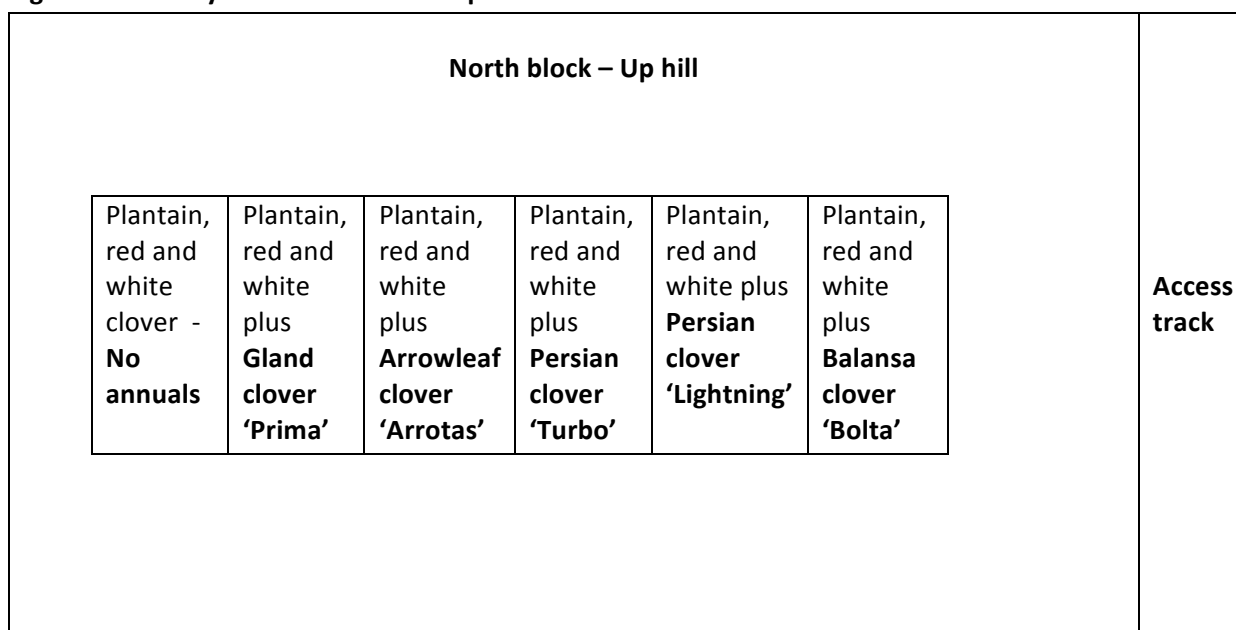
- **12 December 2012** – Glyphosate applied
- **13 January 2013** – Deep ripped twice, 2nd pass on angle
- **Early March 2013** – Discd and levelling bar before drilling
- **19 April 2013** – Centre sown with 6 metre air roller drill
- **25 April 2013** – North sown (including "Trial area)
- **26 April 2013** – South sown
- **5 June 2013** – Counts of established plantain and clover seedlings.
- **10 June 2013** – First graze of Centre block with 124 lambs for 10 days

### *Experimental Area*

Whilst most of the area has been sown in the base mix a trial area of 0.4 ha has been sown in North with different annual clovers.

- A. 6kg/ha 'Bolta' Balansa clover (extensive root system) with plantain and white/red clover
- B. 6 kg/ha 'Lightning' Persian clover (tolerant of waterlogging) with plantain and white/red clover
- C. 6 kg/ha 'Turbo' Persian clover (tolerant of waterlogging) with plantain and white/red clover
- D. 6 kg/ha 'Arrotas' Arrowleaf clover (suited to summer dry) with plantain and white/red clover
- E. 6 kg/ha 'Prima' Gland clover (very early maturing) with plantain and white/red clover
- F. No annuals – Plantain and white/red clover only

**Figure 2 - Plot layout within northern paddock**



**Closing dates to enable re-seeding:**

- Early close – early October
- Mid close – early November
- Later close – early December
- Plus no close

When seed heads are mature they will be collected and seed extracted. Total seed production and hard seededness will be measured.

**Monitoring**

1. Animal weights, grazing days and numbers
2. Plant counts 4-6 weeks from emergence
3. DM production cuts as required plus contribution of plantain, clovers and grass to production

**Measurements**

- Seedlings at 9 weeks/plant numbers before first grazing
- Number of seed heads, seed set and percentage of hard seeds
- Animal performance

**Results**

**Seedling establishment** – High numbers of plantain and clover seedlings were successfully established across the block and within the trial plots (Table 1). Sowing rates were not adjusted for differing seed weights or germination percentage of each clover. Differences in the percentage of viable or soft seed of each clover and seed size are most likely to have caused the variations seen in the numbers of seedlings establishing for each plot. Seedling numbers of 150 plants/m<sup>2</sup> are considered very good establishment rates for plantain.

**Table 1 - Seedling establishment 6 weeks after sowing**

Plot	Clover	Seedlings per m <sup>2</sup>	
		Plantain	Clover
A	No Annuals	151.6	400.4
B	Gland	149.3	395.6
C	Arrowleaf	172.4	381.8
D	Persian – Bolta	147.6	411.1
E	Persian – Lightning	184.4	344.0
F	Balansa	152.0	276.7
Paddock		174.7	489.3

#### *Lessons/observations to date:*

- Broadcasting clovers and plantain on to a prepared seedbed, followed by light tire rolling was very effective in establishing both clovers and plantain.
- Competition from weeds and grasses was minor due to the well prepared seedbed.
- Some clover death has occurred in wetter areas.

#### *Grazing management of plantain for persistence.*

Grazing management is critical to maintain plant number - timing and severity of first grazing after sowing will affect plantain survival and persistence. If plants are grazed after they have six fully developed leaves (30 cm with Tonic) plant losses are generally less than 10%. Grazing earlier than this increases plant losses and reduces pasture persistence as root reserves will not have built up to support post grazing regrowth. As with lucerne, plantain should be rotationally grazed to prevent damage to the crown and growing points, and to maintain feed quality. Grazing frequency is a compromise between maximising animal production and allowing plants time to recover from grazing. Frequent grazing (every 2 weeks) from 8 cm down to 5 cm is recommended for best production and nutritive value as highest lamb live weight gain likely to be achieved when grazing at 7 – 8 cm. This translates to pre-grazing herbage levels of 2000/3500 kg DM/ha and post-grazing residuals of 1000/2000 kg DM/ha. Feed quality and palatability decline with flowering as the proportion of stalk increases. Frequent grazing will minimise the production of seed heads. Animals typically graze the younger, more palatable leaves first.

#### *Grazing summary:*

- Graze when plantain has 6 or 7 true leaves. True leaves must be fully or very near fully expanded.
- Grazing should be done to minimise pugging as plantain crowns are very susceptible to damage when ground is wet.
- The first grazing should remove no more than 2/3 of the existing herbage. Leave 6-8 cm behind.
- Frequent grazing (every 2 weeks) from 8 cm down to 5 cm is recommended for best production and nutritive value. Highest lamb live weight gains likely to be achieved when grazing at 7 – 8 cm.

### *Discussion points:*

- Plantain management options – planned longevity and density of pasture
- Role of annuals – a one-off or managed for re-seeding. Should plantain be sown into land where a large reserve of annual clover seed has been purposely established
- Role of tap and fibrous rooted plants e.g. plantain/red clover/arrowleaf clover/lucerne
- Future animal health benefits from increased legume diet
- Animal health benefits from grazing plantain and clover