

# NORTHLAND DIVERSIFIED FORAGES PROJECT

## BNZ NDDT Field Day

8th June 2017

Within this Northland-based project we are evaluating a range of forages! By diversifying our forage systems we are targeting an improvement in our ability to grow high-quality feed and to assist the reduction on the reliance of imported feeds. We are attempting to gauge:

- Which forages perform in Northland, on a range of soil types?
- What management features are important in achieving success?
- What are the problems and can we, or how do we overcome them?
- What are the financial results?

Some of the forages we are evaluating are:

- New perennial legumes being new genetic material of white and red clover, plus new species to Northland being Kura hybrid clover and Talish tumens clover
- Older biannual legumes, e.g. Sulla
- Older perennial legumes, e.g. Lucerne, lotus major
- Specialized crops, e.g. fodder beet
- Alternative perennial grasses to ryegrass, e.g. Tall fescue, cocksfoot
- Older annual legumes, e.g. sub clover
- New annual legumes, e.g. Arrowleaf, balansa, berseem, crimson, medic, Persian clovers plus tick bean

We are evaluating these forages as sole species in plot trials plus with a range of companion species in paddock-scale sowings.

### Results Highlights

- Some of the annual clovers have shown they can contribute to our forage production, especially in the August to November period.
  - Berseem clover has been the earliest growing annual clover we have monitored, e.g. making up 35 and 28% of the pasture composition in July and still at 29 and 15% in early-December, at Waiharara and Awanui sites respectively for whole-paddock sowings.
  - Balansa and berseem clovers showed daily growth rate of 115 and 161 kg DM/ha/day respectively, at Kerikeri for the period 1 Sept and 16 October
  - We are expecting the most successful annual clovers to provide forage considerably earlier and at higher levels than our traditional legumes such as white and red clover.
  - Growth rates for balansa and berseem clovers at NARF were 103 and 108 kg DM/ha/day respectively, for the period 1 Sept to 19 October.
- Lucerne has shown how suitable it is for the free-draining soils and how unsuitable it is for very wet soils.

At 12 months, two lines of lucerne were 2 & 3% of the plot composition at Awanui. Just south of Dargaville, 12 years plus stands of lucerne averaged 92 kg DM/ha/day during the mid-November to mid-December period 2016 under very dry conditions at that time.
- Lotus and lucerne are able to produce high levels of energy, over and above that produced by white clover, at certain times, e.g. with metabolisable energy levels of 10.3 and 10.4 in late-March, for lotus and lucerne respectively, when growing considerably more forage than white clover, the overall energy produced was 34% greater than from white clover with its 11.5 ME level.
- Lotus major was not really seen at the NARF site before December. This autumn it has produced very well. Growth rate of 84 kg/day from mid-March to 17 April compared very well to the “next best” of 73 for red clover and 77 for lucerne. The other striking feature was how pure the lotus plots were.

**Other results to date are very variable!**

**Example 1 – Waiharara**

Paddock also sown into 5 kg/ha Italian ryegrass, 15 kg/ha of annual clovers and 4 kg/ha of red clover, autumn 2016, following a successful crop of Italian rye and Berseem annual clover the previous winter.

<b>Production Data - kg Dry Matter/hectare</b>				
	<b>Pasture Total</b>	<b>Ryegrass</b>	<b>Annual Clovers</b>	<b>Red clover</b>
Total for 11 months	16,087	11,588	1,761	1,552
as a %		75	16	8
June to November	11,249	8,483	1,761	626
As a %		75	16	6

The initial establishment (from a spray and drill) was very good with Berseem annual clover making up 31% of pasture composition at the first cut. But the Italian ryegrass was very dominant in this high potential site. This Italian fueled overall growth rates of 60 kg DM/ha/day for August and 93 for September and October.

**Example 2 – Awanui**

From a double spray and direct drill April 2016, a more standard sowing mix of 15kg perennial ryegrass, 10kg of annual clover plus 3 of white and 3 of red.

<b>Changing Pasture Composition</b>					
	<b>Ryegrass %</b>	<b>Annual Clover %</b>		<b>White Clover %</b>	<b>Red Clover %</b>
		<b>Berseem</b>	<b>Persian</b>		
July 2016	70	20	0	6	2
October 2016	35	7	53	0	5
December 2016	21	15	24	0	39
April 2017	53	0	0	19	26

Overall yield has been 15,755 kg DM/ha for 12-month period.

<b>Presence of Perennial Legume Species at end of First 12 months</b>				
<b>Clover Plot Data</b>				
		<b>Site</b>		
<b>Species</b>	<b>Cultivar</b>	<b>Awanui</b>	<b>NARF</b>	<b>Te Kopuru</b>
White clover	Mainstay	80	83	75
Lotus major	Trojan	88	85	38
Control – Perennial ryegrass + white clover	Base rye + Kakariki + white	85	92	32
Red clover	Relish	22	68	43
Lotus minor	Goldie	17	17	32
Strawberry clover	Upward	8	15	43
Lucerne	SF7	2	52	15
Lucerne	Breeding Line	3	25	5
Sulla	Wilpena	0	12	28
Sulla	Aokau	0	-	36
Talish clover	Permatas	0-ND	0-ND	0-ND

Kura hybrid clover	Aberlasting	ND	40	45
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**Note:** ND = not determined. Control at the Te Kopuru site has been affected by an “invasion” of plantain.

Perennial Legume Harvest Data				
Site: NARF, Dargaville			Date Harvested: Mid-April 2017	
Species	Pasture Mass from Quadrat Kg DM/ha	Dry Matter %	Growth Total	Estimated growth from mid-March to mid-April Kg DM/ha/day
White clover	2804	12.1	1404	54
Red clover	3292	13.7	1898	73
Lucerne	4854	17.7	2002	77
Lotus Major	3979	9.8	2184	84
Control – rye + clover	3248	18.0	1742	67

## ENERGY PRODUCTION

### Dry matter growth X metabolisable energy level (ME)

The ME figure used is data from 11 April harvest at NARF– assumption is that these ME levels were constant for the whole period.

Species	Total Growth Kg DM/ha	Metabolisable Energy Level MJME	Megajoules of Metabolisable Energy produced over the period mid-March – mid-April (26 days)
White clover	1404	11.5	16,146
Red clover	1898	10.5	19,925
Lucerne	2002	10.3	20,621
Lotus Major	2184	10.4	22,714
Control – ryegrass	1742	11.0	19,162

### Comment

Although the Lotus major had almost the lowest ME test level, its energy production was the highest over the 26-day period due to its higher growth rate: giving 10% more energy produced over the period compared to the next highest producer, being lucerne.

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