

# Future Forage Systems Project

## Lucerne Hub Notes Kinburn, 22<sup>nd</sup> August 2012

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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 Kinburn is to use lucerne to produce better animal returns over what is possible through cropping.

### *Establishment*

The two lucerne paddocks (10 ha and 5 ha) were originally in ryegrass and were sprayed with glyphosate in early October. Aglime (6 Tonne/ha) was applied on 20th October and 300 kg/ha of lucerne mix (NPKS 0-19-51-46) was broadcast worked in. Paddock was conventionally cultivated and deep ripped. Lucerne (cv Kaituna) was sown at 13.35 kg/ha in two paddocks (10 ha and 5 ha) on 4th

Nov 2011 using a Hatzenbichler 16 Broadcast Air Seeding drill fitted to 'Cambridge' roller unit (6m wide). Two soil tests were undertaken in Jan and June 2012 (Table 1).

**Table 1. Soil test results**

Date	pH	Olsen P	Potassium	Sulphate Sulphur	Organic Sulphur
Jan 2012	6.3	36	8	10	13
Jun 2012	6.5	33	5	12	5

Conditions were very dry after sowing and because of a limited first strike the area was irrigated. This led to a secondary strike but as well as a significant weed problem. Because of the different stages of lucerne growth, and the rampant weeds – redroot, black nightshade, stinging nettle, fat hen, convulvulus, knotweed, barnyard grass mallow – made weed control difficult. The area was eventually sprayed with Spinnaker. Weeds were subdued and the lucerne only slightly affected by the herbicide. Subsequently, weeds were well controlled by grazing and mowing off after grazing. In the 5 ha lucerne block, a problem with barnyard grass was controlled with Leopard.

### *Animal performance*

Lucerne paddocks were rotationally grazed five times (average 33 days per rotation) between January and the end of May. The average stocking rate was 25 lambs/ha and the average lamb growth rate was 178 g/d. It was not possible to run lambs separately on the different cultivars. Across the two lucerne blocks and over the 5 month grazing period, lambs deaths averaged 2.7%. The gross margin of 5.6 c/kg DM was heavily influenced by the rapidly falling lamb schedule through summer and the lower than expected lamb growth rates.

### *Cultivar demonstration*

**Establishment:** In the 10 ha paddock, two drill widths were sown with ten lucerne cultivars. Plots sizes were 0.17 ha (278 m x 6 m). Seed rate was adjusted for seed weight and germination percentage with the intention of sowing all cultivars at a similar rate to Kaituna at 12 kg/ha. Two varieties (Runner and Icon) were supplied as bare seed and 'Nodulator' was added to all cultivars at 5 kg/ha. Actual sowing rate was calculated by weighing seed in and out of the drill between cultivars.

**Plant populations:** The life of a lucerne stand is dictated by the number of viable plants and plant numbers are at a maximum soon after sowing - thereafter the stand loses plants (Table 2). Plant populations were assessed on 20 February 2012. Whilst we had a good plant population of 129 plants per m<sup>2</sup> (range 80-185 plants/m<sup>2</sup>) there is clearly a large loss of viable seed. In spite of sowing around 500 seeds per m<sup>2</sup> and having a germination percentage of 92%, the 129 plants per m<sup>2</sup> measured 3 months after sowing meant that only 26% of the seeds sown resulted in viable plants.

**Table 2. Sowing data, plant populations and estimated % seed loss (Blue = bare seed)**

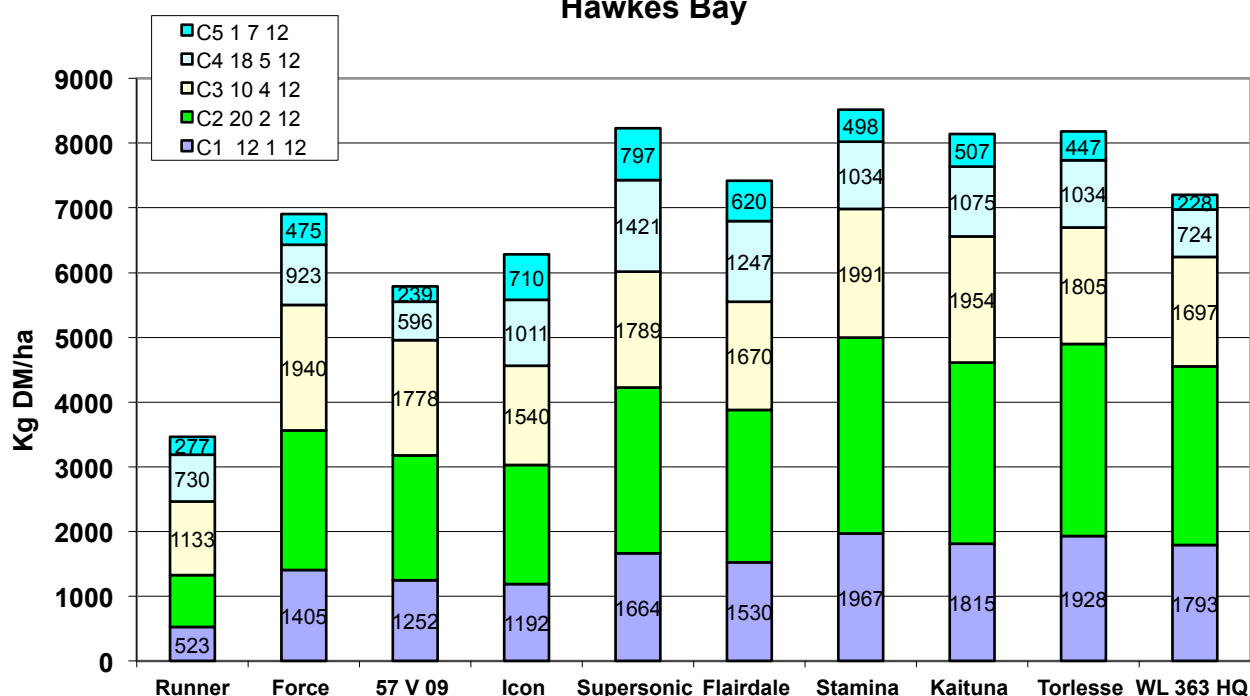
Cultivar	TSW (grms)	Seeds/ 1 grm	Seeds/kg	Seeds/m2	Seed rate adjusted to TSW	seeds/m2	Seed rate after sowing	Seeds/m2 sown	% Germination	% Success	Estab. Plants/m2	% Seed loss
Runner 2	2.3	435	434783	43	8	348	12	534	91	80	100	81
Force 4	2.45	408	408163	41	9	348	12	479	94	95	119	75
54 V 09	2.3	435	434783	43	8	348	10	443	98	95	135	70
Icon	2.35	426	425532	43	8	348	17	722	68	80	120	83
Supersonic	2.7	370	370370	37	9	348	12	449	100	95	82	82
Flairdale	3	333	333333	33	10	348	14	454	96	95	109	76
Stamina 5	3.5	286	285714	29	12	338	16	444	94	95	169	62
Kaituna	3.45	290	289855	29	12	348	16	469	93	95	132	72
Torlesse	2.9	345	344828	34	10	348	14	488	95	95	143	71
WL 363 HQ	2.5	400	400000	40	9	348	13	518	88	95	185	64

**Production data:** DM production was measured prior to each grazing by taking 3 quadrats per cultivar (Table 3). Average production from sowing on 4<sup>th</sup> Nov to July was 7000 kg DM/ha with a range from 3468 to 8516 kg DM/ha. Highest growth rates were achieved in Stamina (78 kg DM/ha/day between mid-Jan and mid-Feb. Highest winter growth rates (15 kg DM/ha/day) were achieved in Supersonic between mid-May and July.

**Table 3. Production data from 10 lucerne cultivars in Hawkes Bay**

Cultivar	Cut 1 12/1	Cut 2 20/2	Cut 3 10/4	Cut 4 18/5	Cut 5 1/7	Total
Runner	523	805	1133	730	277	3468
Force	1405	2160	1940	923	475	6903
57V09	1252	1925	1778	596	239	5790
Icon	1192	1832	1540	1011	710	6285
Supersonic	1664	2559	1789	1421	797	8229
Flairdale	1530	2352	1670	1247	620	7419
Stamina	1967	3025	1991	1034	498	8516
Kaituna	1815	2792	1954	1075	507	8143
Torlesse	1928	2965	1805	1034	447	8179
WL363HQ	1793	2756	1697	724	228	7199

### Seasonal production (kg DM/ha) from 10 lucerne cultivars in Hawkes Bay



**Winter activity:** Based on an international scoring system, lucerne cultivars are given a dormancy rating (1 = winter dormant and 10 = highly winter active) (Table 4). Our own scores were based on cuts made at the last cut (July). Early indications are that the cultivars ratings are a reasonably good guide in this environment, although 54V09 and WL363HQ appear to be more winter dormant than the international dormancy score would suggest.

**Table 4. Winter dormancy of 10 lucerne cultivars in Hawkes Bay**

Cultivar	Our 2012 score	International score
Runner	3.0	2
Force	5.0	4
57 V 09	2.0	4
Icon	6.0	6
Supersonic	9.0	9
Flairdale	7.0	7
Stamina	6.0	5
Kaituna	6.0	5
Torlesse	5.5	4
WL 363 HQ	2.5	5

**Persistence:** The cultivar demonstration aims to examine persistence/production under grazing. We will continue to monitor plant populations and production of the cultivars to address this question. High performing cultivars in Year 1 may not be the best performers in subsequent years.

**Issues:** Our biggest problem is poor animal performance. This may be a problem with low dry matter/high protein levels. Our intention is address this by incorporation plantain/prairie grass into lucerne to utilise the nitrogen being fixed as well as boosting overall DM production.

## *Summary*

- Goal is to finish lambs on lucerne at a better return than cash cropping
- Lucerne was spring sown and irrigated. This resulted in a serious weed problem which was controlled with Spinnaker along with grazing and mowing.
- A typical sowing rate of 12 kg/ha results in approximately 500 seeds per m<sup>2</sup>. Yet when plant counts were done 3 months after sowing plant populations were 129 per m<sup>2</sup>. This means only 26% of seeds sown produced viable plants.
- Ten lucerne cultivars were sown to evaluate production/persistence under grazing. In Year 1, best performing cultivars were Stamina, Supersonic, Torlesse and Kaituna.
- One cultivar (Supersonic) produced growth rates of 15 kg DM/ha between mid-May and July
- Lamb growth rates on lucerne were disappointing at 178 g/d. This may have been the result of low moisture content and/or high protein content in the lucerne. The gross margin of 5.6 c/kg DM were heavily influenced by the falling schedule through the summer as well as the poor lamb growth rates
- Future work will look at incorporating plantain/prairie grass into lucerne to improve animal performance.