Frazer & Murray McKnight
Ida Valley
Feed Quality & Quantity

Feed Demand & Supply

Programme

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- Rob Phiskie – Introduction
- Peter Young on Re-designing Central Otago farm systems to better use what feed we have
- Dr David Stevens – what is in our dry matter – reading a feed analysis and understanding what to do with it
- Farm tour – to winter crops and silage/baleage
- Rob Phiskie - dry matter, ME and feed budgeting
- Dr Andrew Wall – how the lucerne for lambs programme fits into the whole farm approach
- Fraser McKnight – what we have got out of our redesigned system so far
- Discussion

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- Quantity – kgDM
- Quality – MJME/kgDM
- Feed Supply
- Feed Demand
- Cost of weight loss
- Inefficiency of weight loss
- Feed Budget

Quantity

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A kg of Dry Matter is any feed with all water removed, dried at 105°C for 24 hrs

Approximate values

- Barley is 85% DM – harvested at 15% DM
- Grass 10 to 30% DM
- Rape/Kale 11- 22%DM
- Turnips-whole crop 9%
- Swedes-whole crop 11%

Quality

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ME or MD = metabolisable or digestible

MJME/kgDM = Megajoules of Metabolisable energy per kg of dry matter

This is roughly equivalent to what we used to call calories.

Quality Continued

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E.g. Barley/kale/rape/swedes/turnip/fresh grass
12.5 ME

Straw
8.0-8.5 ME

Hay
8.5-9.0ME

Balage & Silage
8.8-12ME

Silage: What and Why

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Good Crop & Conditions

Vegetative ryegrass
Lucerne up to 10% flower
Cereal Silage
Vegetative – no seedhead
Whole Crop – grain at 'zit' stage

DM%	**28 – 38% Whole crop <48%**
Sugars	**Higher than 10%**
Fibre	
Acid Detergent Fibre	**20-35%**
Neutral Detergent Fibre	**30-45%**
pH	**3.7-4.5**
ME	**Above 10.5**

Good compaction
No dirt
No holes in cover and weighted (tyres)

Aerobic Fermentation
Enzymes active, change sugars to CO_2 & H_2O + heat.
Bacteria produce acetic acid and lower pH.
2-3 Days

Anaerobic Fermentation
Produces Lactic acid
Some Acetic acid
Some Ammonia (NH_4)
3-4 Weeks

Reduces pH

Smells good
High Palatability
High Digestibility

Good quality silage can be used for anything – high ME means weight can be put on, more milk produced or less fed for maintenance. Good quality silage is cheaper to make. You get more megajoules of energy for your dollar than with poor silage.

Silage: What and Why

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Poor Crop & Conditions

Reproductive ryegrass
(seed head visible)
Lucerne above 10% flower
Cereal Silage
Reproductive–seed head visible
Whole Crop – "Ripe' DM
over 48%

DM% Less than 25 or higher than 48%
Sugars Less than 10%
Fibre
Acid Detergent Fibre Higher than 35%
Neutral Detergent Fibre Higher than 5%
pH Higher than 4.6
ME Below 9.5

Poor compaction
Dirt introduces bacteria
usually off tractor tyres.
Flapping cover.

Aerobic Fermentation
Enzymes active, change sugars to CO_2 & H_2O + heat.

Bacteria produce acetic acid and lower pH.
2-3 Days

Aerobic Fermentation
Clostridial bacteria produce Butyric acid.
Risk of moulds, fungi and other poisons.
High Ammonia (NH_4) production.
Some anaerobic fermentation
3-4 Weeks. Low lactic acid.

Higher pH

Smells bad
Poor Palatability
Low Digestibility

Poor quality silage will not put weight on animals regardless of how much they are fed. Silage under ME 9.5 needs a high quality feed (barley, PKE, brassicas, greenfeed) with it to maintain animals.
Sheep farmers using silage for winter maintenance can get away with silage around 9.5 ME because it is usually fed with winter greenfeed. This silage is usually made after November with seed head and some dead material. It is always more expensive to make poor quality silage.

The Cost of Weight Loss

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For example when

- a cross bred ewe is worth about $120

  @ 60kg → $2/kgLW

- Barley at $320/t

  850kgDM (85%DM)→ 41c/kgDM

- To break even needs 4.8kg barley/ewe = 16 days barley at 300g/day

If this is before tupping the saved 1 kg LW is worth about 2.2% lambing

$75/lamb = $1.65

The Inefficiency of Weight Loss

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- It takes 69MJME to put on 1 kg LW
- When 1kgLW is taken off only 16MJME is recovered.

Hopefully the weight is taken off when feed cost is high (winter) and put on when it is cheap (spring) but this is still inefficient.

If weight loss is high, say 2 BCS = 10kgLW, then animal production may take more than one year to recover.

Yield guesstimates

Kale

Knee High	5000kgDM/ha Rape crop – 1st graze
Crutch High	6000-7000kgDM/ha
Waist High Head High	8000-10000 kgDM/ha 12-15000 kgDM/ha

These figures are a guide only. Bare land and spacing between plants makes a considerable difference

Swedes and Turnips

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Tennis ball	4500kgDM/ha
Soft ball	6000kgDM/ha
Bread & butter plate	10000kgDM/ha

These figures are a guide only. Bare land and spacing between plants makes a considerable difference

Grass – Leafy green

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Short – less than 50mm, in rows not filled in.	Less than 500kgDM total, maybe harvest 100kgDM/ha
Medium – 150mm, rows filled in	2600kgDM/ha 2000kg harvested (available)
High – tops of leaves falling over, starting to go off in the bottom	3800kgDM/ha 3200kg available

Greenfeed Cereals

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Knee High	3500kgDM/ha
Mid-Calf	1800kgDM/ha
Ankle	1000kgDM/ha

The yield of cereals is deceptive, there is less than their height suggests.

Balage & Hay

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- Balage → 220 – 240kgDM/bale

- Hay → about 85% DM.

  Bale sizes and weights are very variable, weigh if possible, definitely before purchase. DM can be up to 450kgDM/bale

Contractors are invariably optimistic

Silage

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- Silage is 180-230kgDM/m^3
- Contractors overestimate yield often by as much as 30%.
- The best way to measure silage is estimate the DM yield in the paddocks and multiply by the area minus 15% wastage.

Pressure of work means this doesn't get done. Give yourself a medal if you manage to do it.

Silage Lab Test

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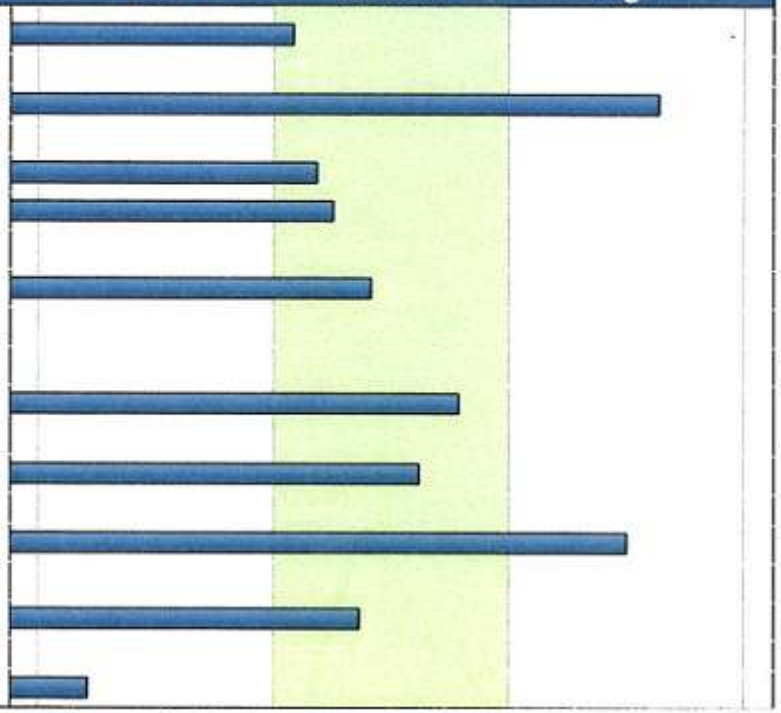
Sample Name: Lucerne
Sample Type: Lucerne, Silage (P314)

Lab Number: 782542.3

Analysis		Level Found	Medium Range
Nitrogen	%	3.3	3.2 - 4.8
Dry Matter	%	44.6	20.0 - 35.0
Crude Protein	%DM	21.9	20.0 - 30.0
Acid Detergent Fibre	%DM	27.5	25.0 - 35.0
Neutral Detergent Fibre	%DM	33.1	
Ash	%DM	9.9	7.0 - 14.0
Soluble Sugars	%DM	5.4	
Starch	%DM	1.2	
Digestibility of Organic Matter in Dry Matter (DOMD)	%	67.9	60.0 - 70.0
Metabolisable Energy	MJ/Kg	10.9	9.0 - 12.0
pH	pH Units	5.1	3.8 - 4.5
Ammonium-N	%DM	0.23	
Ammonium-N/Total-N Ratio	%	6.8	5.0 - 10
Lactic Acid	%DM	2.4	4.0 - 8.0



Rape & Carrot Lab Test

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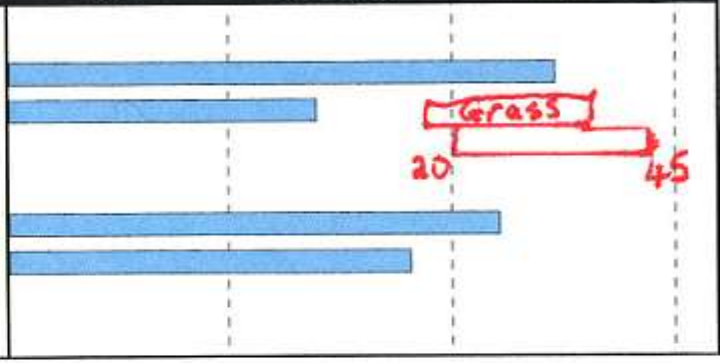
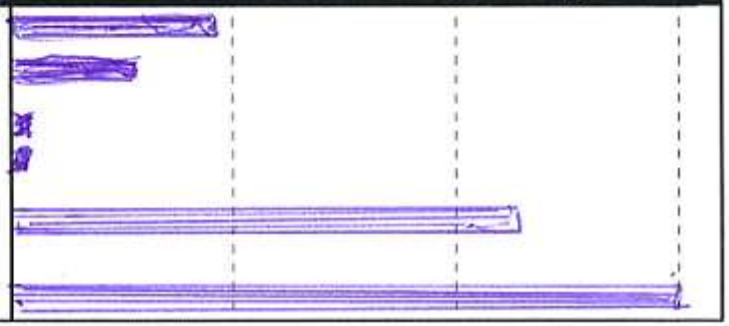
Sample Name: Goliath Kale/Rape
Sample Type: LEAF Kale (P127)

Analysis		Level Found	Medium Range
Dry Matter	(%)	9.7	
Crude Protein	(%DM)	26.7	13.0 - 24.0
Acid Detergent Fibre	(%DM)	17.0	12.0 - 25.0
Neutral Detergent Fibre	(%DM)	17.8	
Ash	(%DM)	12.5	
Digestibility (DOMD)	(%)	77.0	65.0 - 75.0
Metabolisable Energy	(MJ/kg)	12.3	9.5 - 13.0
Soluble Sugars	(%DM)	20.7	



Sample Name: Carrot
Sample Type: General, Animal Feed (E10)

Analysis		Level Found	Medium Range
Dry Matter	(%)	9.5	
Crude Protein	(%)	8.2	
Acid Detergent Fibre	(%)	8.5	
Neutral Detergent Fibre	(%)	9.2	
Ash	(%)	5.3	
Digestibility (DOMD)	(%)	76.3	
Soluble Sugars	(%)	55.4	



Feed Budget – Pasture Growth

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Name:

25/05/2010

1 DEFINE FEED BUDGET PERIOD

MONTH	DAYS	DAYS FOR YOUR FEED BUDGET	Maniatoto Average year kgDM/day	YOUR PASTURE GROWTH kgDM/day	TOTAL PASTURE GROWTH kgDM/ha
January	31		15		0
February	28		5		0
March	31		20		0
April	30		15		0
May	31		5		0
June	30	30	0	0	0
July	31	31	0	0	0
August	31	31	5	5	155
September	30	30	25	25	750
October	31	5	40	30	150
November	30		35		0
December	31		25		0
Total	Days	127			1055
					KgDM/ha

(transfer to 2b)

Feed Budget – Greenfeed

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2 Calculate the Feed Supply

(a) Feed on Hand

Total Farm Area 835 ha

(I) Pasture (Average cover)

800	ha	X	1000	kgDM/ha	800000	kgDM
	ha	X		kgDM/ha	0	kgDM
	ha	X		kgDM/ha	0	kgDM
800	ha		**Total Feed on Hand**		**800000**	

(ii) Supplement

Feed Crop *(Available yield at grazing)*

35	ha	X	3500	kgDM/ha	122500	kgDM
	ha	X		kgDM/ha	0	kgDM
	ha	X		kgDM/ha	0	kgDM
	ha	X		kgDM/ha	0	kgDM
	ha	X		kgDM/ha	0	kgDM
35	ha		**Total Feed Crop**		**122500**	
835	ha		**TOTAL PAGE 1**		**922500**	**kgDM**

Feed Budget – Supplements

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Supplement

(III) Hay

200	Bales	X	380	kgDM/bale	76000	kgDM
	Bales	X		kgDM/bale	0	kgDM
	Bales	X		kgDM/bale	0	kgDM
	Bales	X		kgDM/bale	0	kgDM
				Total Hay	76000	

rg=ryegrass straw,mh=meadow hay,
lh=lucerne hay

(iv) Silage

200	Tonnes	X	35	%DMx10	70000	kgDM
	Tonnes	X		%DMx10	0	kgDM
	Tonnes	X		%DMx10	0	kgDM
				Total Silage	70000	

(v) Balage

300	Bales	X	200	kgDM/bale	60000	kgDM
	Bales	X		kgDM/bale	0	kgDM
	Bales	X		kgDM/bale	0	kgDM
				Total Balage	60000	

(vi) Grain

40	Tonnes	X	850	kgDM/tonne	34000	kgDM
	Tonnes	X	850	kgDM/tonne	0	kgDM
				Total Grain	34000	
				Total Supplements	**240000**	
				TOTAL KG DM ON HAND	1162500	**kgDM(A)**

(b) Pasture Growth

500	ha	X	1055	kgDM/ha	527500	**kgDM (B)**

TOTAL FEED SUPPLY (A+B) 1690000 **kgDM**

Feed Budget – Feed Demand

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(c) Stock Requirement Budget period 127 Days

Stock Type	Number	Daily Demand kgDM/day	Number of Days	Total kgDM
Ewes	5000	1.2	106	636000
Ewes	5000	1.8	21	189000
				0
Hoggets	1250	1	127	158750
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
TOTAL STOCK REQUIREMENT				983750

(d) Where applicable, **lambing requirement or pasture cover required** at the end of the feed budget period. (use average cover)

500	ha X	1000	kgDM/ha	500000

Feed Budget – The Result

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TOTAL FEED SUPPLY (A+B)	1690000
TOTAL REQUIREMENT (C+D)	1483750
SURPLUS OR DEFICIT	206250
Plus 15% wastage if wet conditions	1706313
Surplus/deficit including 15% wastage	**-16312**

Thios deficit is equivalent to

82 bales of balage
19 t barley
4.7 ha of winter feed at 3500kgDM/ha

For an excel version

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