Introductory Nutrition & Rationing
for ruminants.

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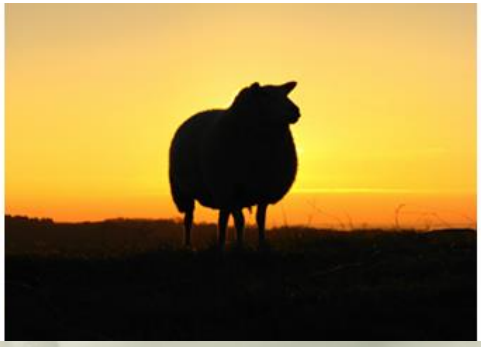
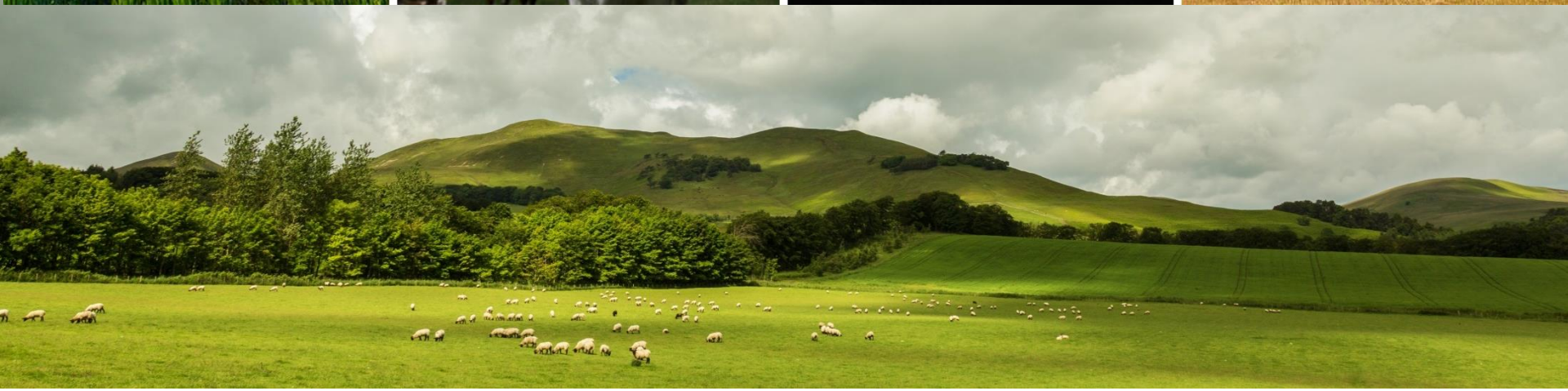
Trevor Polley New Entrant Meeting 29 Jan 2018







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Ruminant feed

- Protein
- Energy
- Mineral
- Vitamins
- Water
- Fibre

Dry Matter (DM)

- A measure of what is not water

- *Important to know:*
- to compare feeds and know what you are feeding,
- to understand how much feed you have in store,
- to know how much feed you will need.

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DM example

- 1 tonne hay @ 85% DM (850 g/kg) = 850 kg DM
- 1 tonne silage @ 25% DM (250 g/kg) = 250 kg DM
- The nutrient (energy, protein, etc.) is in the dry matter content, not in the water.

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DM example

- If the hay and silage both had energy content of 9 MJ/kg DM;

  Hay 850 kg DM = 7,650 MJ energy/fresh tonne

  Silage 250 kg DM = 2,250 MJ energy/fresh t.

Metabolisable Energy (ME MJ/kg DM)

- A measure of the usable energy available to the animal when fed

Crude Protein (CP%)

- A measure of the protein content (but not of the protein quality)

- Measure of nitrogen (N) in the feed. Assumes all the N is in protein and all protein contains 16%N. Because of inaccuracy of these assumptions it is called crude protein.
- %CP = %N x 6.25

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Protein

- The animal needs Metabolisable Protein (MP). Normally this comes from microbial protein (feed the rumen microbes which then digested)

- but at times of high demand (e.g.late pregnancy) we may need to supplement with **DUP** (Digestible Undegradable Protein) which passes through rumen to small intestines.

Ruminant digestive system

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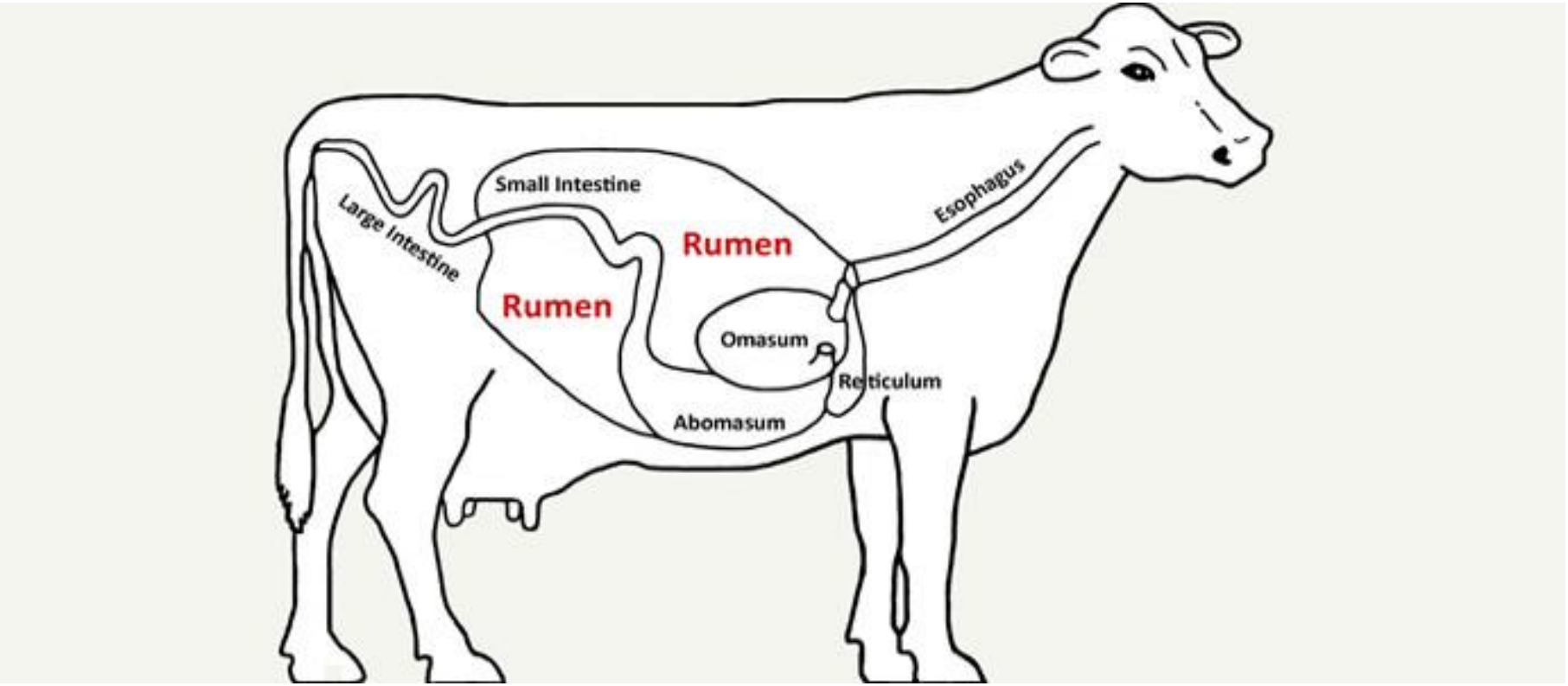

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Ruminant digestive system

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1. Rumen = fermentation
2. Reticulum = regurgitation (cud) or to omasum
3. Omasum = large surface area absorbs water & some minerals
4. Abomasum = digests protein from feed & ruminal microbes

- Small intestine = enzymes break down & absorbs nutrients
- Large intestine = Water & mineral absorption and active fermentation

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How much do animals need?

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- Energy, (ME) growing cattle; 11 MJ day for every 100kg liveweight
- Plus 47 MJ day for every 1kg liveweight gain.
- Plus 5.2 MJ for every litre of milk
- (Outwintering 10 – 15% more required.)

- Maintenance requirement for 500kg cow = ?
- 250 kg stirk + 1 kg DLW = ?

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Tables

- There are numerous tables and recommendations available. Many variables due to breed, condition, production.

- Often flat-rate feeding. (i.e. dry cow ration based on requirement 8 wks before calving)

- Adjusted according to body condition score.

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Example energy table

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Total daily ME allowances for dry suckler cows								
AHDB								
			Total ME requirement					
Liveweight (kg)	Maintenance		DLWG -0.50kg	DLWG -0.75kg	DLWG -1.00kg	DLWG +0.50kg	DLWG +0.75kg	DLWG +1.00kg
500	62		55	47	38	93	103	111
550	66		59	50	42	97	107	116
600	71		63	54	46	101	111	120
650	75		67	58	49	105	115	124
700	79		70	62	53	108	119	128
750	83		74	65	56	112	122	132

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Feed analysis

- Use standard feed analysis from tables or labels, or own silage analysis.
- Examples;

Feed	Dry matter %	ME MJ/kg DM	CP g/kg DM
Grass silage	30	10	100
Sugar beet pulp	90	12.5	100

Ration (QMS chart)handout

- 700 kg cow, 30 days pre calving = 90 MJ ME/day

- Ration using silage & sugar beet pulp?

Ration?

- Silage 29 kg (fresh weight) x 30% = 8.7 kg DM
- 8.7 x 10 MJ = 87 MJ

- Or could use?
- SBP 8 kg x 90% = 7.2 kg DM
- 7.2 x 12.5 MJ = 90 MJ
- Why not?

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Appetite. Will she eat it?

- How much can cattle eat?
- Rule of thumb; Can eat approx. 2.5% of bodyweight in dry matter per day.

- So a 700kg cow could eat 17.5 kg DM/day

- Depends on breed & production

Protein

- The ration needs sufficient protein
- Rule of thumb; Protein requirement (grams) = energy supplied (MJ) x 11.8
- So if 90 MJ ME/day then needs 1,062 g CP

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Protein

- So how much protein is in our ration?

Feed	Dry matter %	ME MJ/kg DM	CP g/kg DM
Grass silage	30	10	100
Sugar beet pulp	90	12.5	100

- If silage 8.7 kg DM (29 kg fresh wt.)

  8.7 x 100 = 870 g protein.

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Additional protein needed

Feed	Dry matter %	ME MJ/kg DM	CP g/kg DM
Grass silage	30	10	100
Sugar beet pulp	90	12.5	100
Suckler rolls	90	12	160

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Additional protein needed

- If reduce silage to (fresh 26.6 kg) 8 kg DM

  = 80 ME & 800 CP
- Include suckler rolls (1.66 fresh Kg) 1.5 kg DM

  = 18 ME & 240 CP
- Total 98 ME & 1040 CP
- *Too much ME, not enough CP ?*

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18% nuts

Feed	Dry matter %	ME MJ/kg DM	CP g/kg DM
Grass silage	30	10	100
Sugar beet pulp	90	12.5	100
Suckler rolls	90	12	160
Beef nut 18	90	12	180

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18% nuts

- Silage (fresh 26.6 kg) 8 kg DM
  = 80 ME & 800 CP
- Beef nuts 18 (1.66 fresh Kg) 1.5 kg DM
  = 18 ME & 270 CP
- Total 98 ME & 1070 CP

Feedbyte

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- SAC ration programme
- Silage 32.6 kg (fresh) = 9.8 kg DM

- ERDP Effective rumen degradable protein
- DUP Digestible undegraded protein
- MP Metabolisable protein

Silage 32.6 kg fresh = 9.8 kg DM

	Animal Requires	Diet Supplies		
ME	98	98	MJ	0
ERDP	605	828	g	+ 223
DUP	36	107		+ 71
MP	422	492	g	+ 70
	1063	1427		

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Exercise

- In small groups;
- Use feed analysis tables to calculate rations for 700 kg cow at other times of the year (from QMS chart).
- 1st 60 days lactation
- Peak lactation
- Late lactation
- Maintenance

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Mineral + vitamins

- Essential.
- Local knowledge of deficiencies
- Supplement
- Vet advice?

Mineral + vitamins

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- Important for lamb vigour
- Vitamin E; 100 – 150 IU/kg compound feed

- Selenium; Works with Vit. E – high levels boost immunity
- – Shown to reduce incidence of retained placenta
- – Promote milk yield

- Iodine; Essential for newborn lamb to control body temperature

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Silage report

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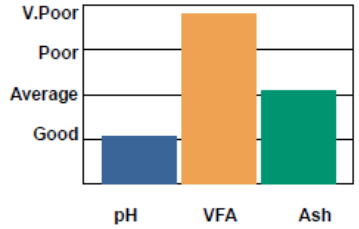
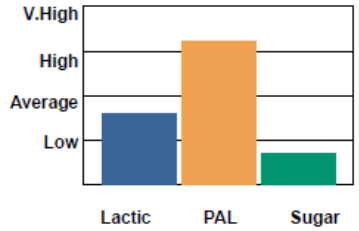
Feeding Value

Dry Matter (g/kg)*	246
D-value (%)*	68.0
ME (MJ/kg DM)	10.9
Protein (g/kg DM)*	133
SIP (gDM/kgLW^0.75)*	101
NDF (g/kg DM)*	492
Sugar (g/kg DM)	37
Oil (g/kg DM)	37
Ash (g/kg DM)	77
TFA (g/kg DM)	116.1
PAL (meq/kg DM)	896

Fermentation quality

pH (NIR)*	4.4
Lactic Acid (g/kg DM)	53.3
VFA (g/kg DM)	62.8





Degradability Characteristics

	s	a	b	c
Dry Matter	0.27	0.34	0.57	0.036
Nitrogen	0.66	0.69	0.26	0.084

* The above silage results were produced using the Forage Assurance Analysis Models on fresh silage material .

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Condition score

- Animal condition. Relative score. Cattle & sheep

1 diet

Fat	Thin
Overfed	**Underfed**

Grouping at start of winter

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Feed

Less	Same	More
Fat	**Average**	**Thin**

Same total feed/day

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Sheep

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Sheep.

- Ruminants.
- Much smaller rumen capacity.
- Quality feed, good silage, DUP
- especially later pregnancy twins.

Sheep energy needed

- Maintenance for a dry ewe (70 kg) is low at 8 MJ ME/day
- But this increases significantly in late pregnancy and lactation.
- (see handout)

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Sheep energy requirement

- 75 kg ewe:
- Ewes in good condition losing 0.5 CS
- in last months of pregnancy

ME MJ/d	Weeks before lambing			
	8	6	4	2
Single	10	11	12	14
Twins	11	12	14	17

Example ration; ewe 75kg pregnant twins

Kg/d	Weeks before lambing			
	8	6	4	2
Hay	Ad lib			
Conc. 12 ME 18% CP	0.2	0.4	0.6	0.8

Kg/d	Weeks before lambing			
	8	6	4	2
Average silage	Ad lib			
Conc. 12 ME 18% CP	-	0.25	0.45	0.6

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DUP in late pregnancy

- Digestible undegraded protein bypasses the rumen
- (In late pregnancy microbial protein is not enough)
- Protein level 18% CP in compound
- Gives no indication about quality of protein

- Feed 100g soya per lamb carried/ewe/day for last 3 weeks
- Improved colostrum quality
- Also found to reduce worm burden

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Post lambing

- If ewes on good silage with good access they will consume around 1.6% BW on a DM basis
- Ewe with twin lambs, producing 2kg milk/day require around 25MJ to maintain body condition
- Ewes reach peak milk yield between 3-4 weeks post lambing

Lactation on grass

- Ewes at grass supplementation will depend on:
- – Ewe body condition
- – Number of lambs at foot
- – Grass quality and quantity
- Set stocked ewes won't require additional feeding if grass above 4cm
- When grass quality or quantity is poor, continue feeding ewes 3-4 weeks after lambing

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Mg on grass

- Magnesium deficiency (grass staggers) problem in peak lactation
- especially if ewes turned out on lush spring grass
- – Provide Mg supplement
- – Include 0.7% Mg in the concentrate feed

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Take Home Messages

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- Using feed you've got (e.g. silage) plus what you can get (availability, price, feasibility) calculate a ration.
- Get your forage analysed, know what you've got (quality & quantity)
- Weight of your animals?

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Take home messages

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- Use condition scoring to group animals.
- Group cows feed according to condition (and re-assess cows half way through winter) to prevent cows losing/gaining excessive condition over winter
- Group sheep (scanning) into single, twins, thin flocks.

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Thank you

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