

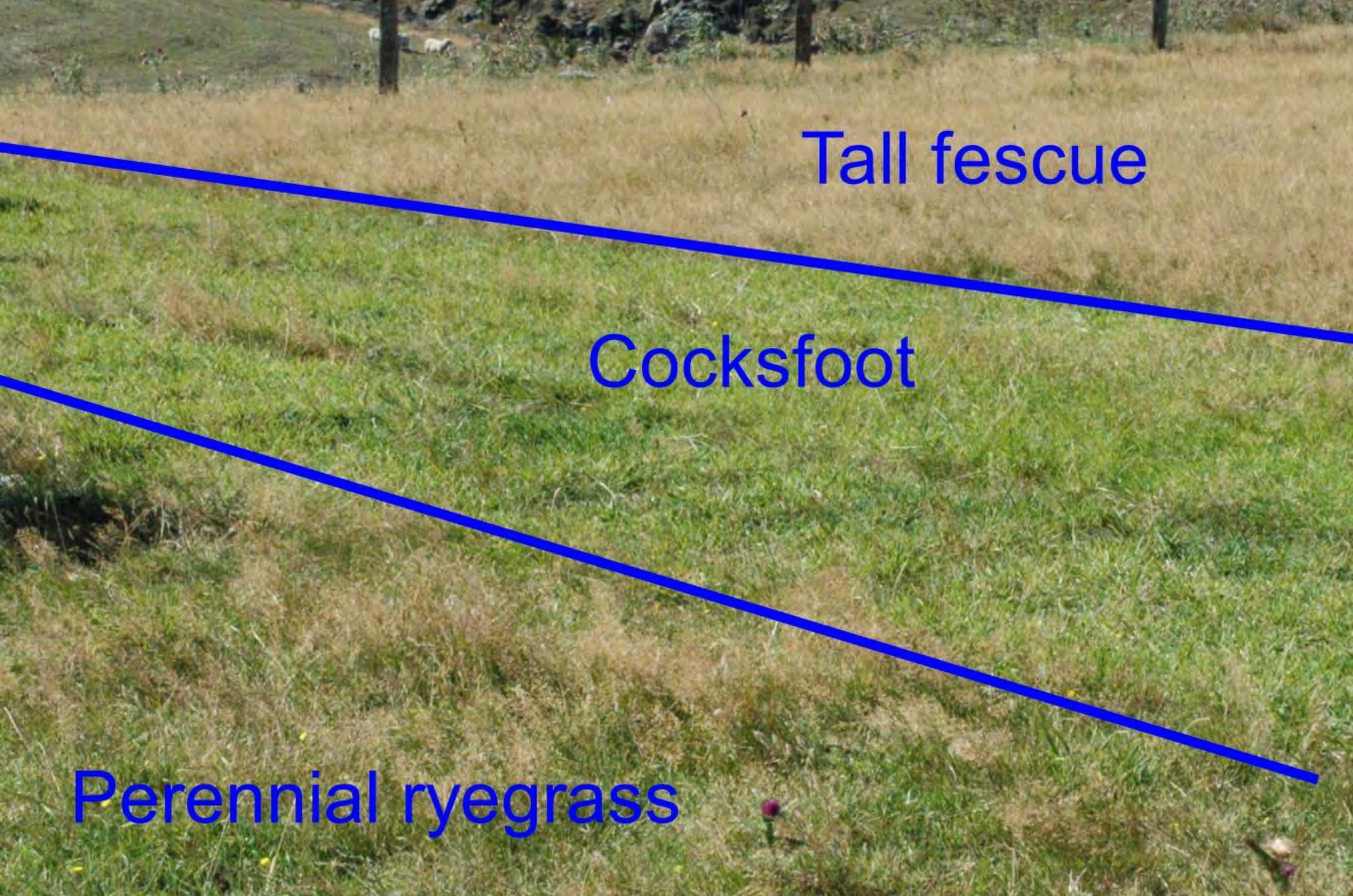
LUCERNE

- agronomy and grazing management

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Tall fescue

Cocksfoot

Perennial ryegrass



Rg/Wc

Lucerne

CF/Sub

CF/Balansa

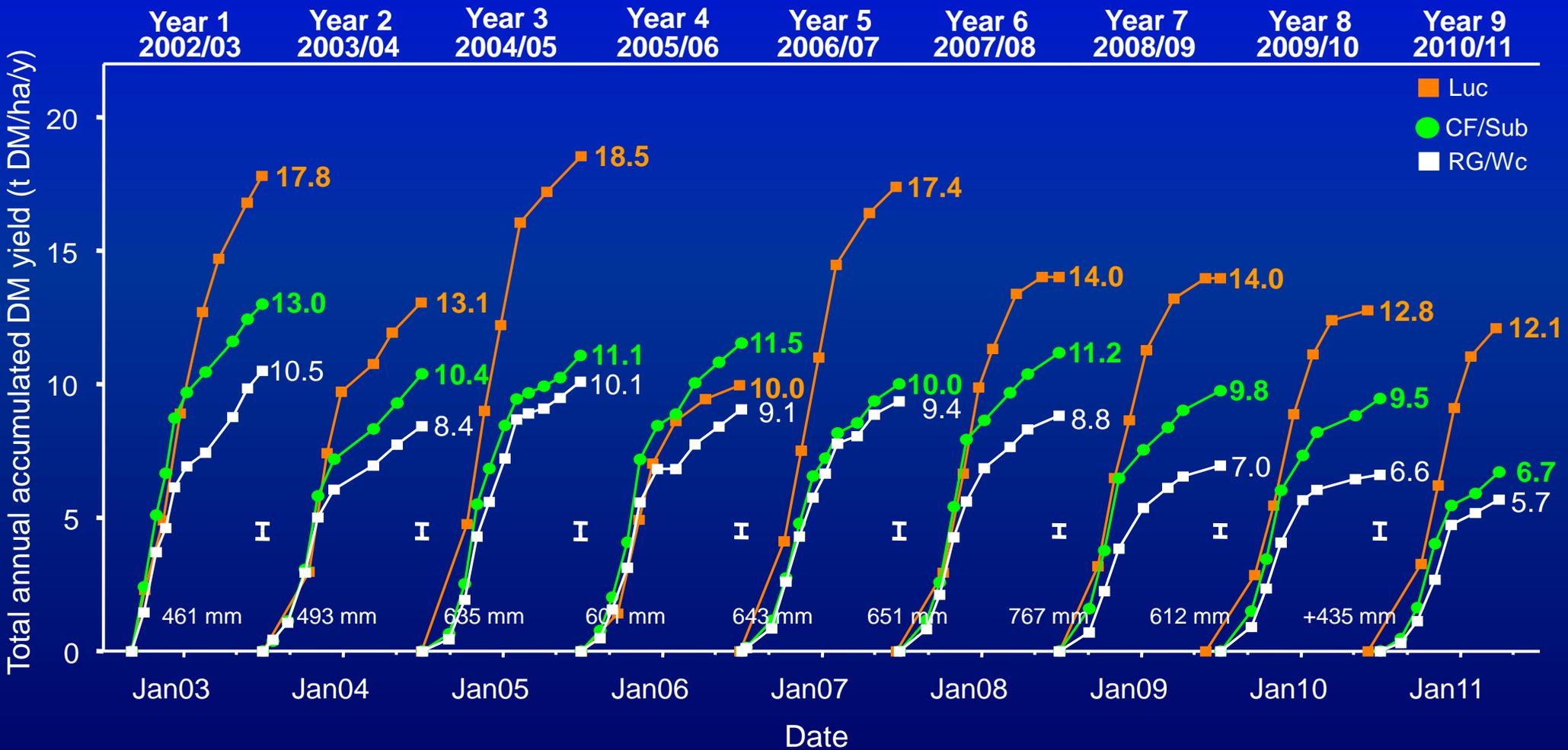
CF/Cc

CF/Wc

'MaxClover'

'MaxClover' Total DM Yields

(to 30 March 2011)



RG/Wc pastures

Unsown species <5% in Year 1>45% in Year 6

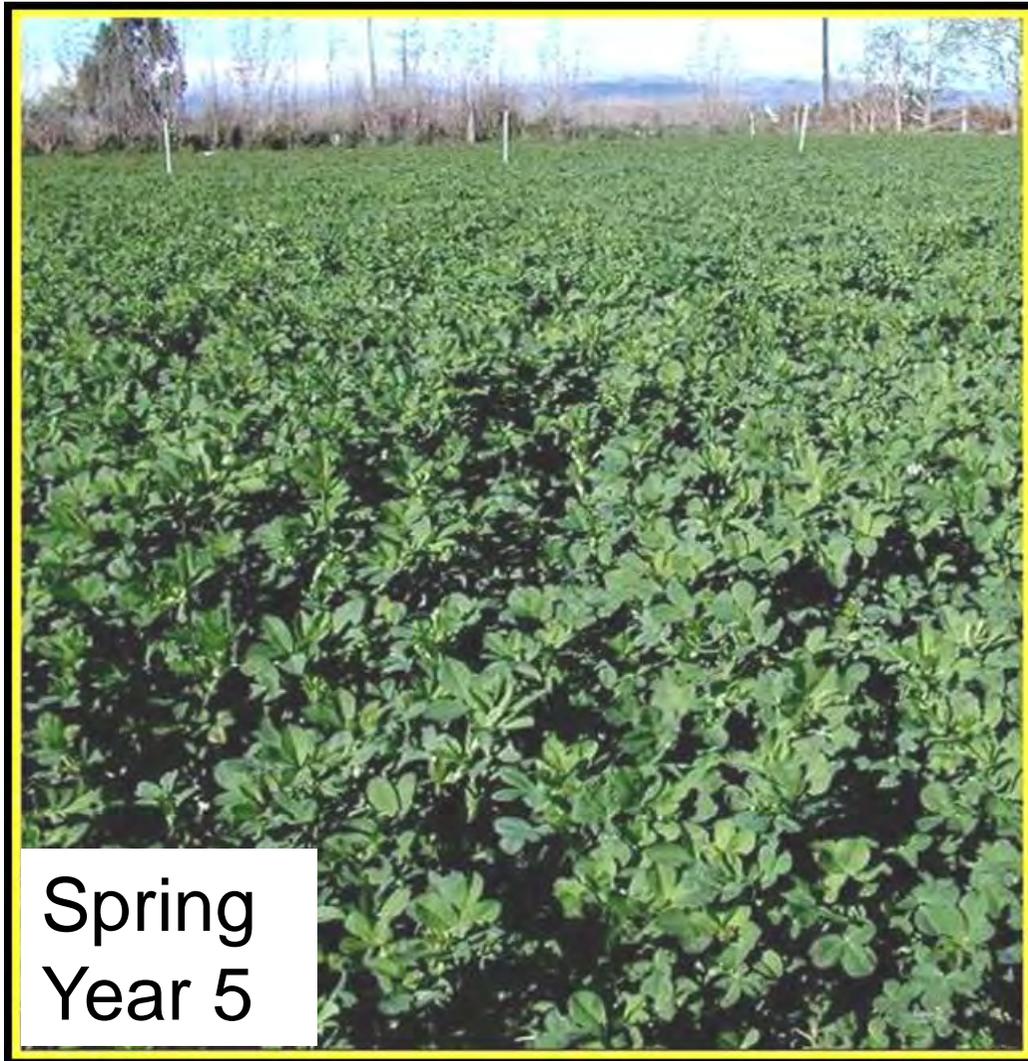
Spring
Year 2



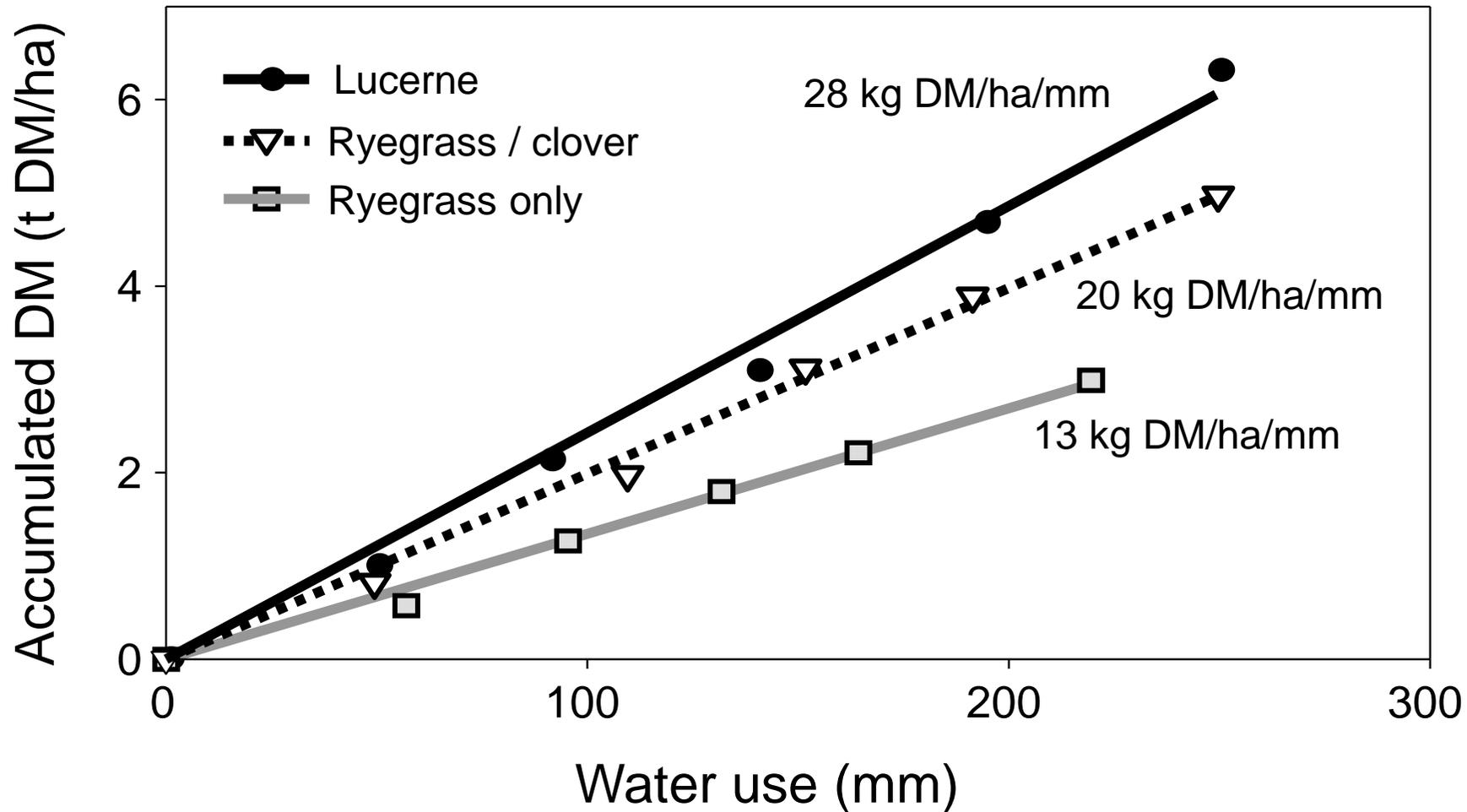
Summer
Year 4



Lucerne pastures



Spring WUE: legume = (nitrogen)



These are urine patches

400 kg N/ha

15 t DM/ha/yr

30 kg DM/mm water



this is GRASS...



6 t DM/ha/yr

10 kg DM/mm water

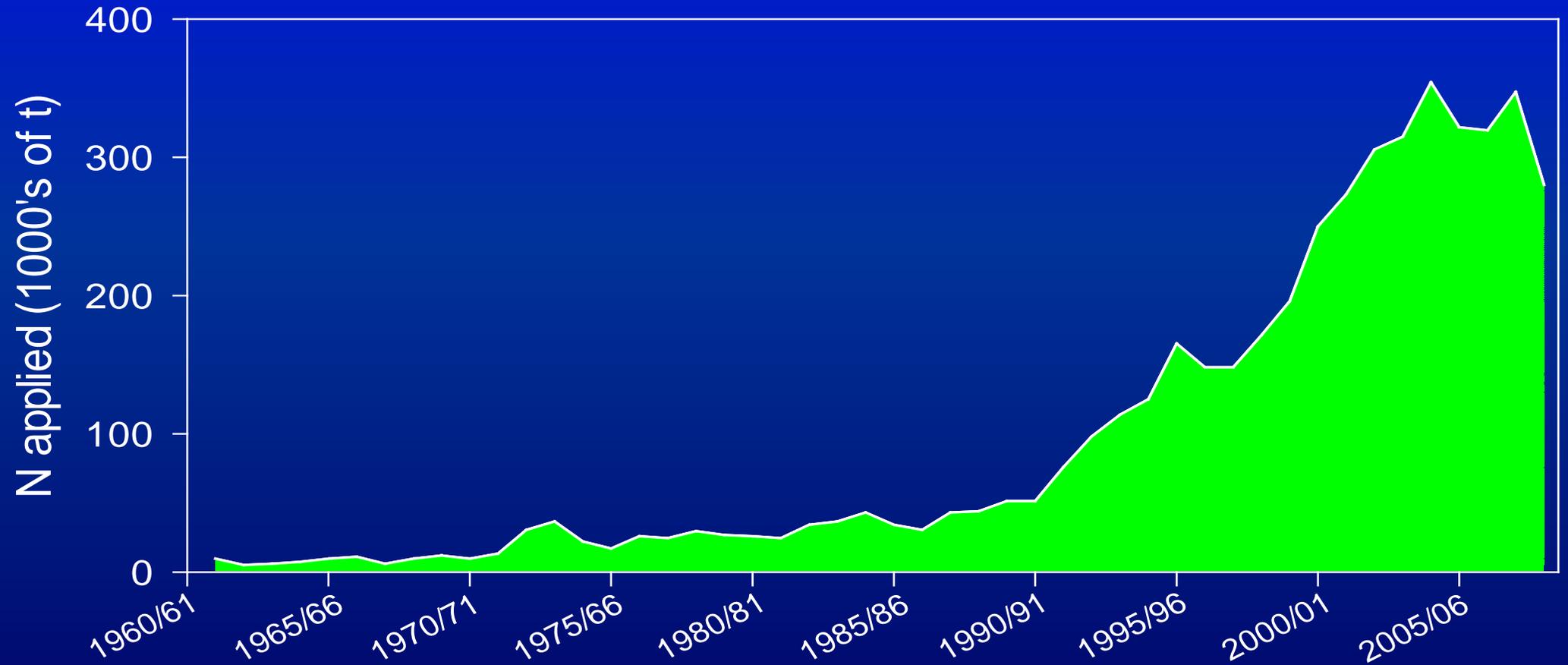
N deficient grass

Nitrogen deficient pasture

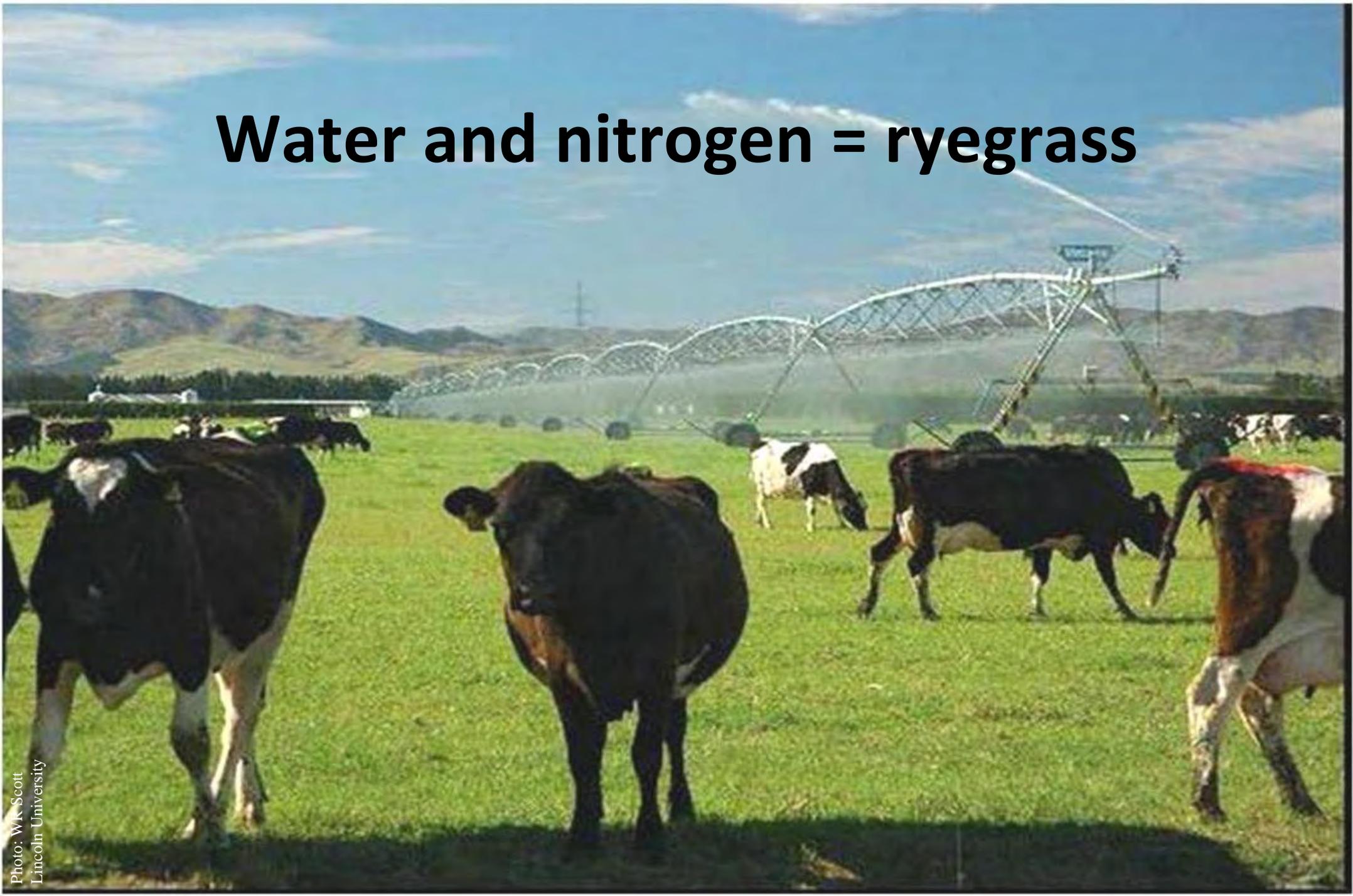


1000 kg N/ha

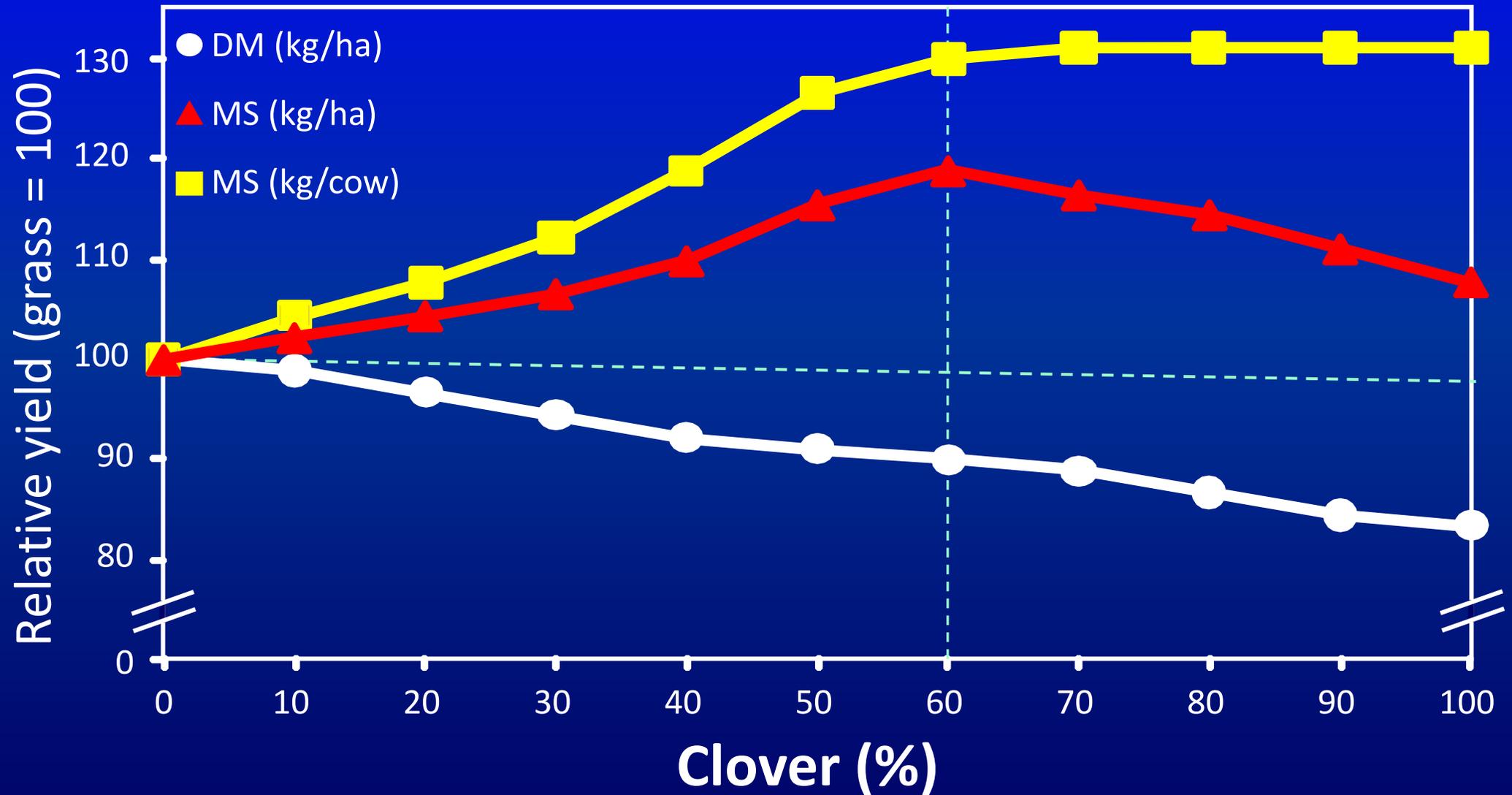
Nitrogen fertiliser use



Water and nitrogen = ryegrass



Clover content & milksolids production





Sheep prefer 70% legume, 30% grass

Resistance to Pests and Diseases

Cultivar	Dormancy	BGA	PA	SAA	BW	SN	PRR	VW	LD
Grasslands Kaituna	I	R	R	R	R	R	R	-	MR
Grasslands Otaio	I	R	R	R	R	R	R	-	S
Grasslands Torlesse	D	HR	R	R	R	R	R	-	MR
P54Q53	D	MR	MR	MR	HR	HR	HR	-	-
P54V09	D	-	HR	R	HR	HR	HR	HR	-
Runner	D	-	-	-	R	-	S	-	-
Wairau	SD	S	S	S	S	S	S	S	S
WL 325HQ	I	R	R	R	R	MR	R	-	-

BGA = Blue-green aphid

BW = Bacterial Wilt

VW = Verticillium wilt

D = Dormant

SD = Semi-dormant

PA = Pea aphid

SN = Stem nematode

LD = Leaf diseases

HR = 50%+ resistant

MR = 16-30%

SAA = Spotted alfalfa aphid

PRR = Phytophthora root rot

R = Resistant = (31-50%)

S = Susceptible

1. Lucerne establishment

- Soils**
- deep free draining
 - pH 6.0 – 7.0
 - rg/wc fertility

- Sowing**
- inoculated
 - 10-25 mm
 - bare or coated 8-10 kg/ha
 - spring or autumn (grass grub)
 - cultivated or direct drilled
 - after fallow?



Photo: DJ Moot
Lincoln University





Pre-development

- browntop
- hieracium
- sweet vernal
- <5% legume

- 
- Low palatability
 - Low production
 - Low legume

Lime and Fertiliser Application

Lime 3-5 ton/ha

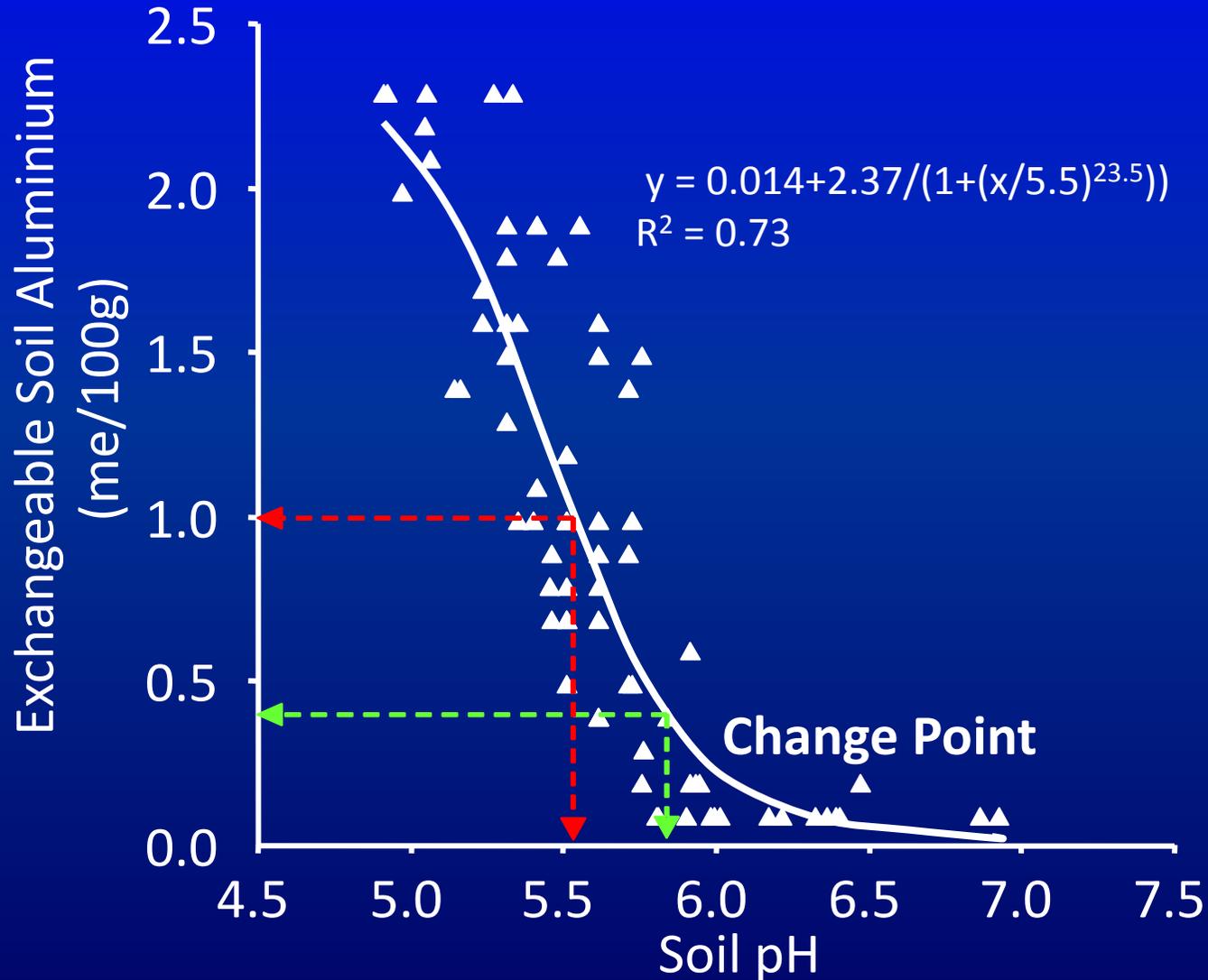
Fertiliser 250-500kg/ha



Typical 0.15 m soil test results for pre (2008) and post (2010) fertiliser applications from three Central Otago farms.

	pH	Olsen P ($\mu\text{g/ml}$)	Potassium (QTU)	Sulphur ($\mu\text{g/g}$)	Aluminium (mg/kg)
Pre-Development (2008)					
Hills Creek	5.2	10	5	14	2.6
Huntleigh	5.2	10	5	1	6.3
Styx	5.2	13	13	3	5.7
Post-Development (2010)					
Hills Creek	5.8	19	9	31	0.9
Huntleigh	6.0	18	4	25	1.5
Styx	6.1	29	13	23	1.1

Soil pH & exchangeable Aluminium





Lucerne root

~8 months after sowing

> 1.5 m length

Photo: D Hollander
Lincoln University



Autumn Spraying

- Timing is Critical
- Most important tool
- Glyphosate, granstar, penetrant

Key Results

- Conserve soil moisture
- Kill mass root systems



2nd Spray – Spring
Glyphosate, insecticide, penetrant

Result from Autumn spray, photo taken 1 November 2010

Drilling seed with fertiliser
Direct drilling = seed + fertiliser



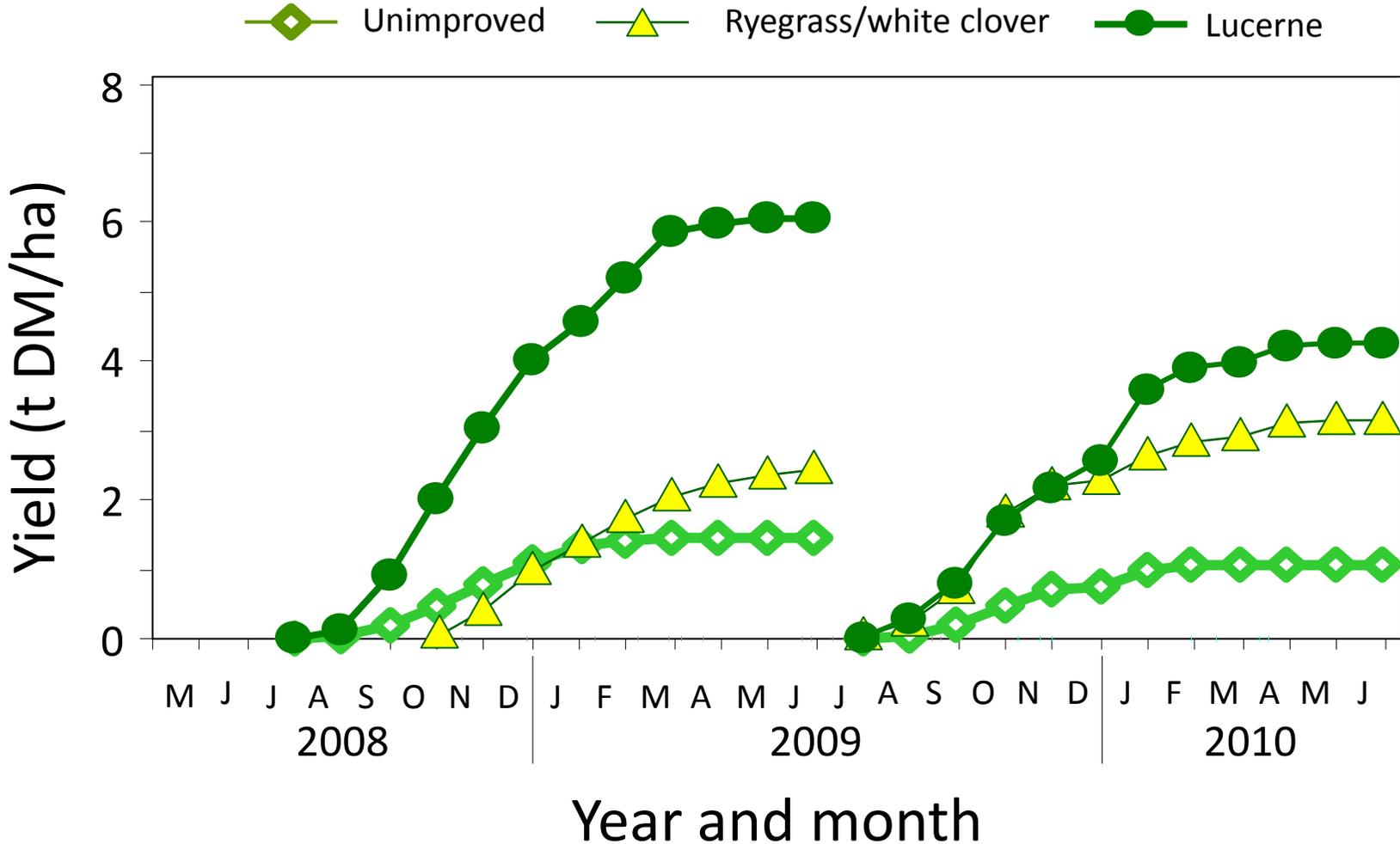
Sown 21/11/2007

Photo taken 1/11/2010

Styx Station



Pasture growth







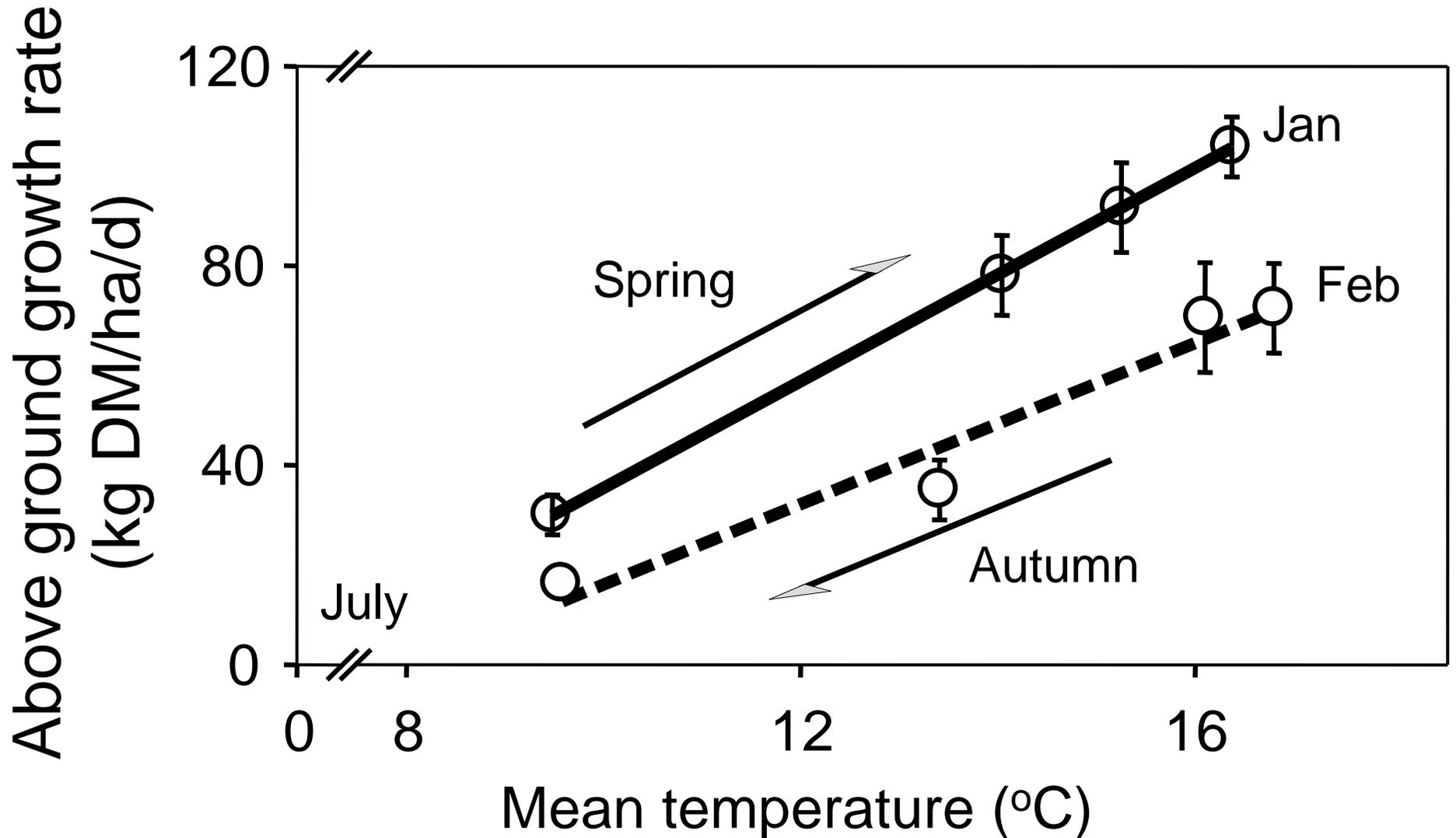
Seasonal grazing management

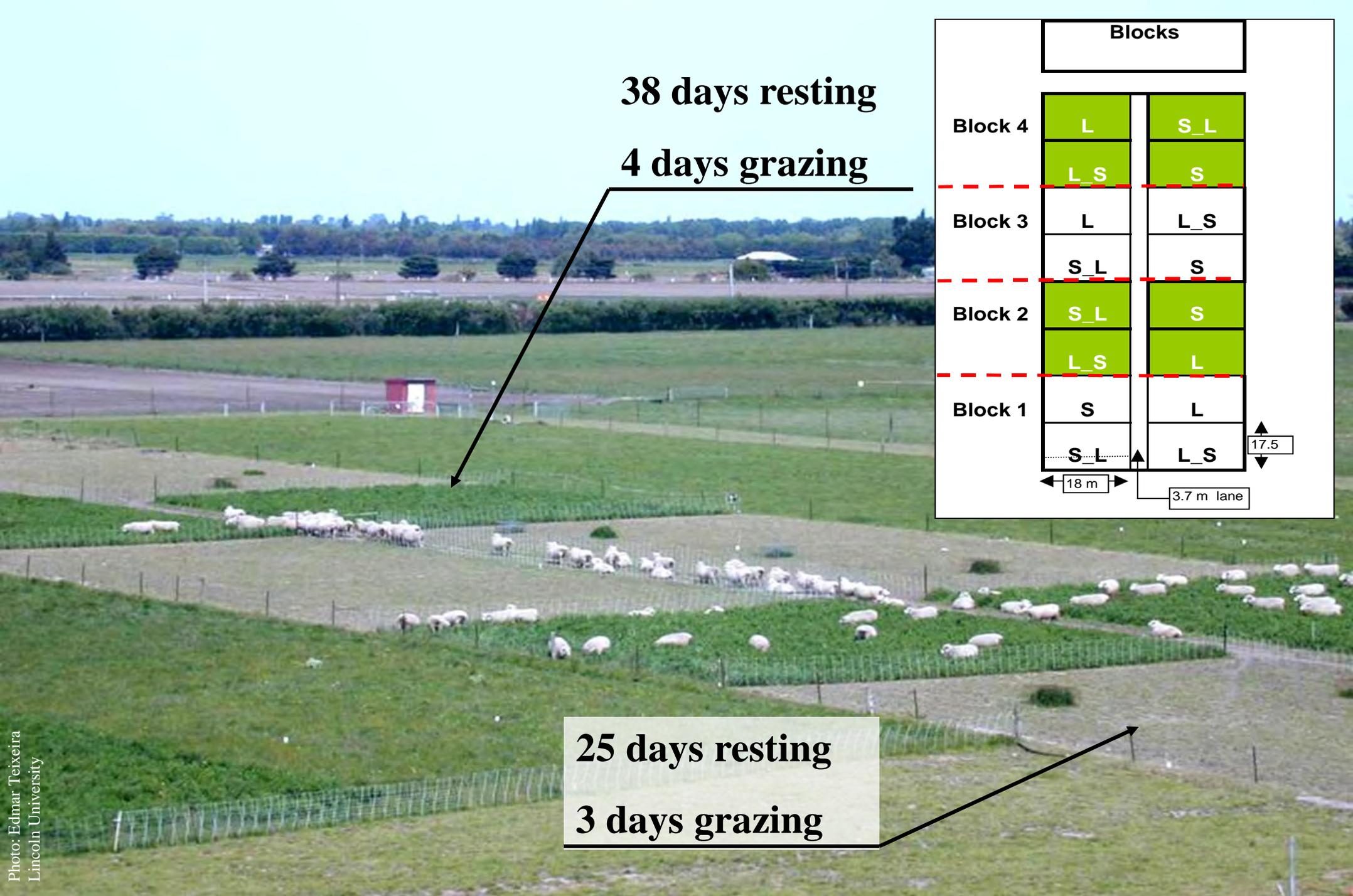
Spring

- 1st rotation aided by root reserves to produce high quality vegetative forage.
- can graze before flowers appear (~1500 kg DM/ha) ideally ewes and lambs but

Never lamb on or set stock lucerne

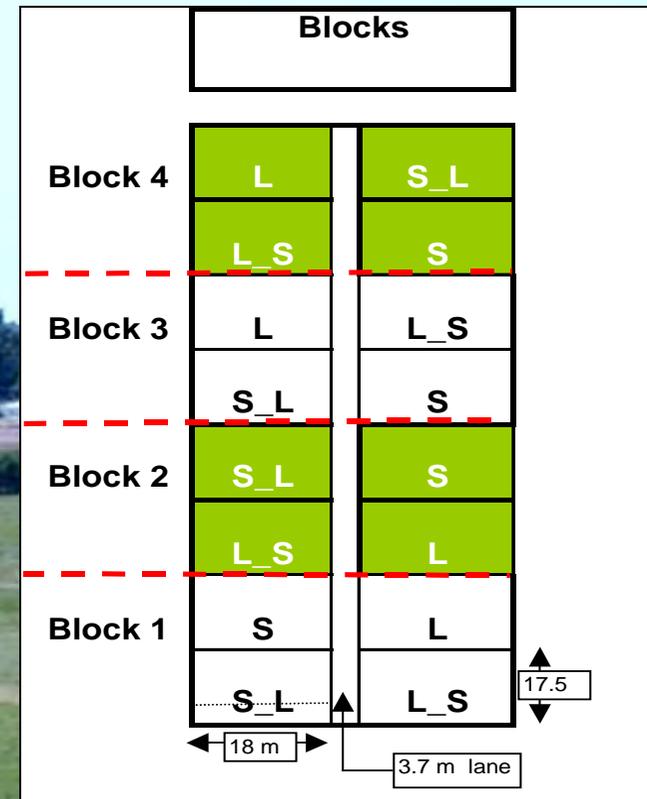
Vegetative growth





38 days resting

4 days grazing



25 days resting

3 days grazing

Partitioning to roots

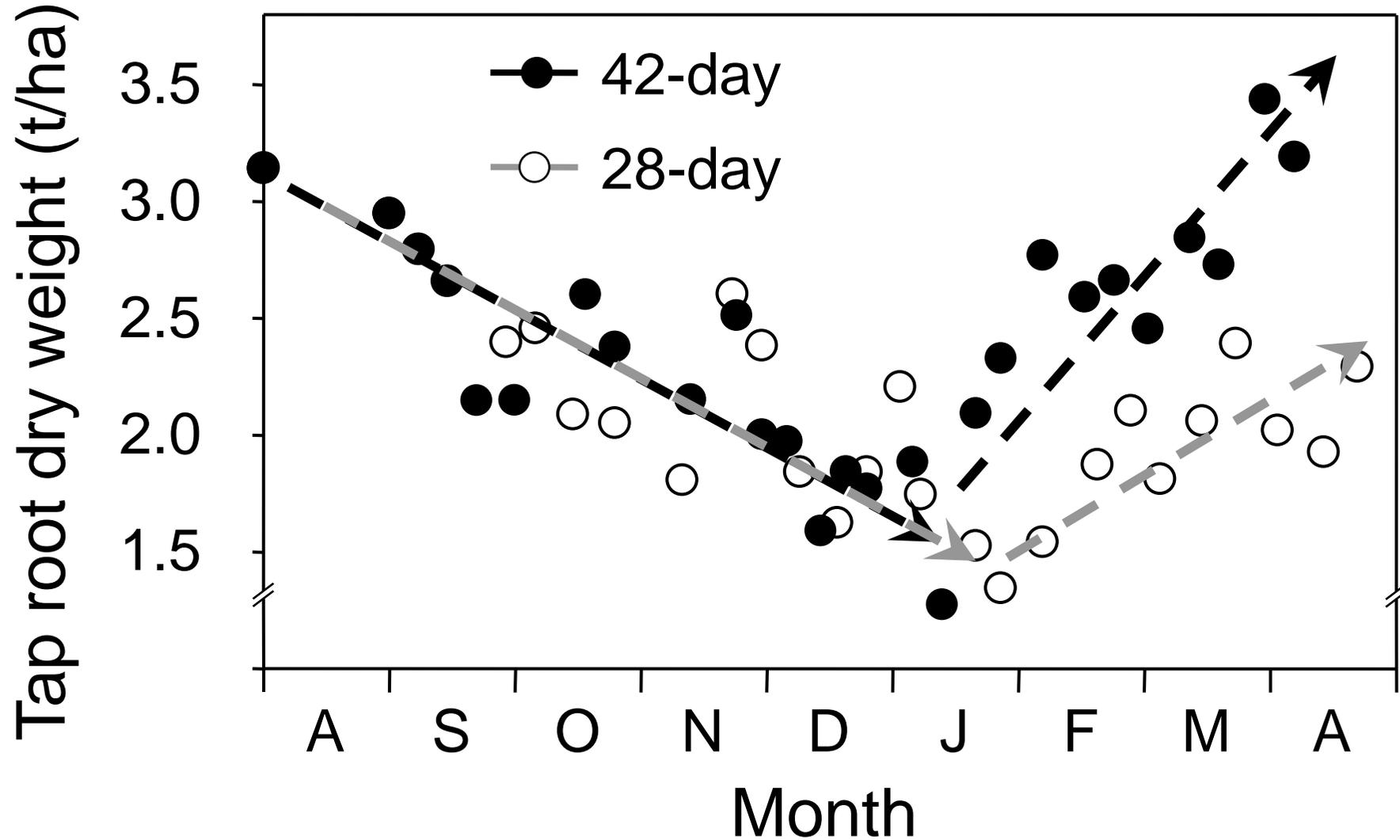


Photo: Edmar Teixeira
Lincoln University



Doug and Fraser Avery "Bonavaree"

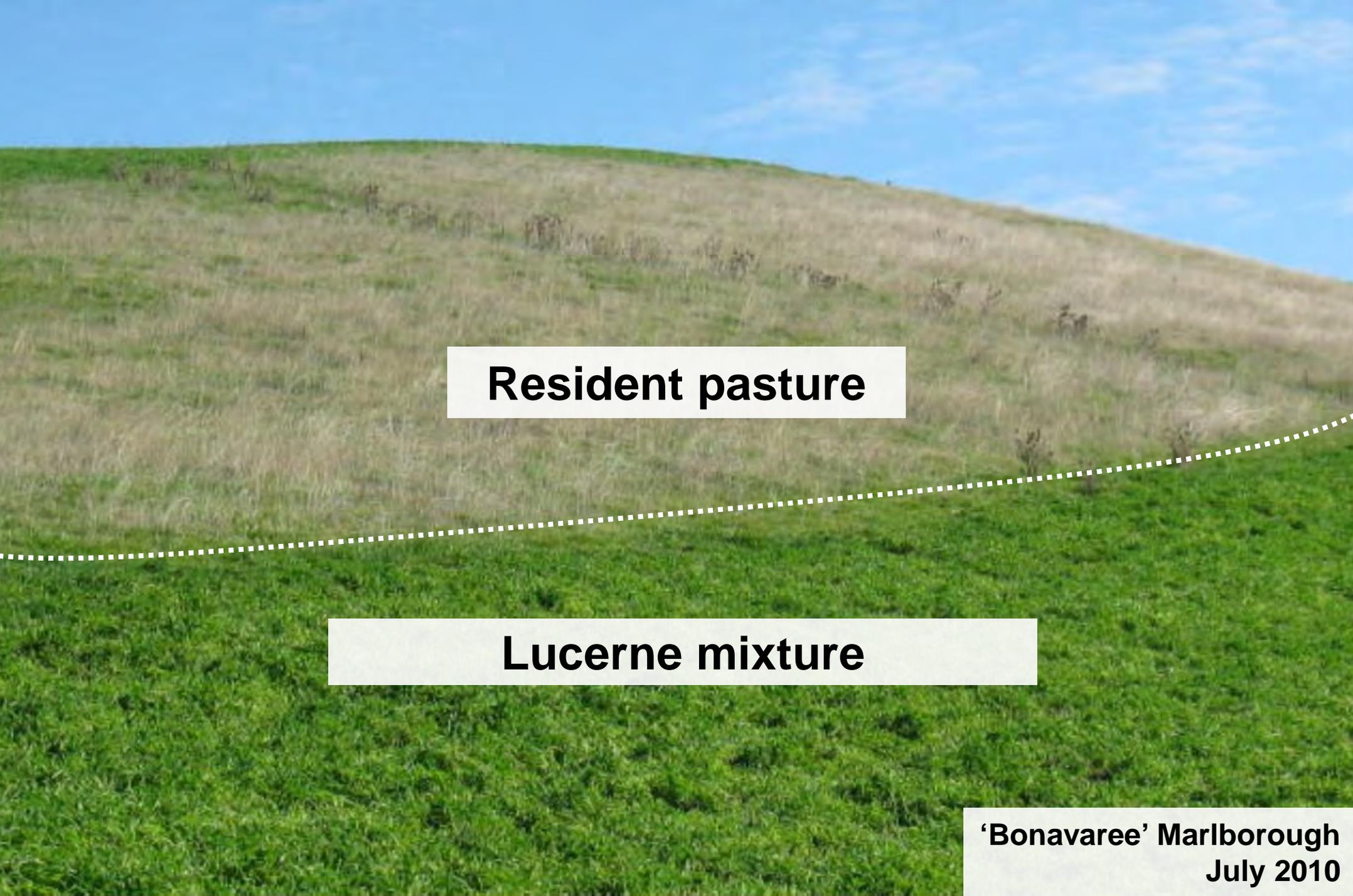


23/01/2005

Seasonal grazing management

Spring/summer (Nov-Jan)

- Priority is stock production (lamb/beef/deer)
- graze 6-8 weeks solely on lucerne
- 5-6 paddock rotation stocked with one class of stock (7-10 days on)
- allowance 2.5-4 kg DM/hd/d – increase later in season



Resident pasture

Lucerne mixture

**'Bonavaree' Marlborough
July 2010**

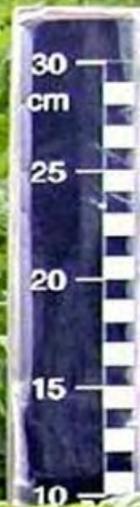


**'Bonavaree' Marlborough
July 2010**

Maximize reliable spring growth – high priority stock



Rotation 1 Pre-graze
Plot 1 (21/9/07)
2.3 t DM/ha
20-25 cm tall

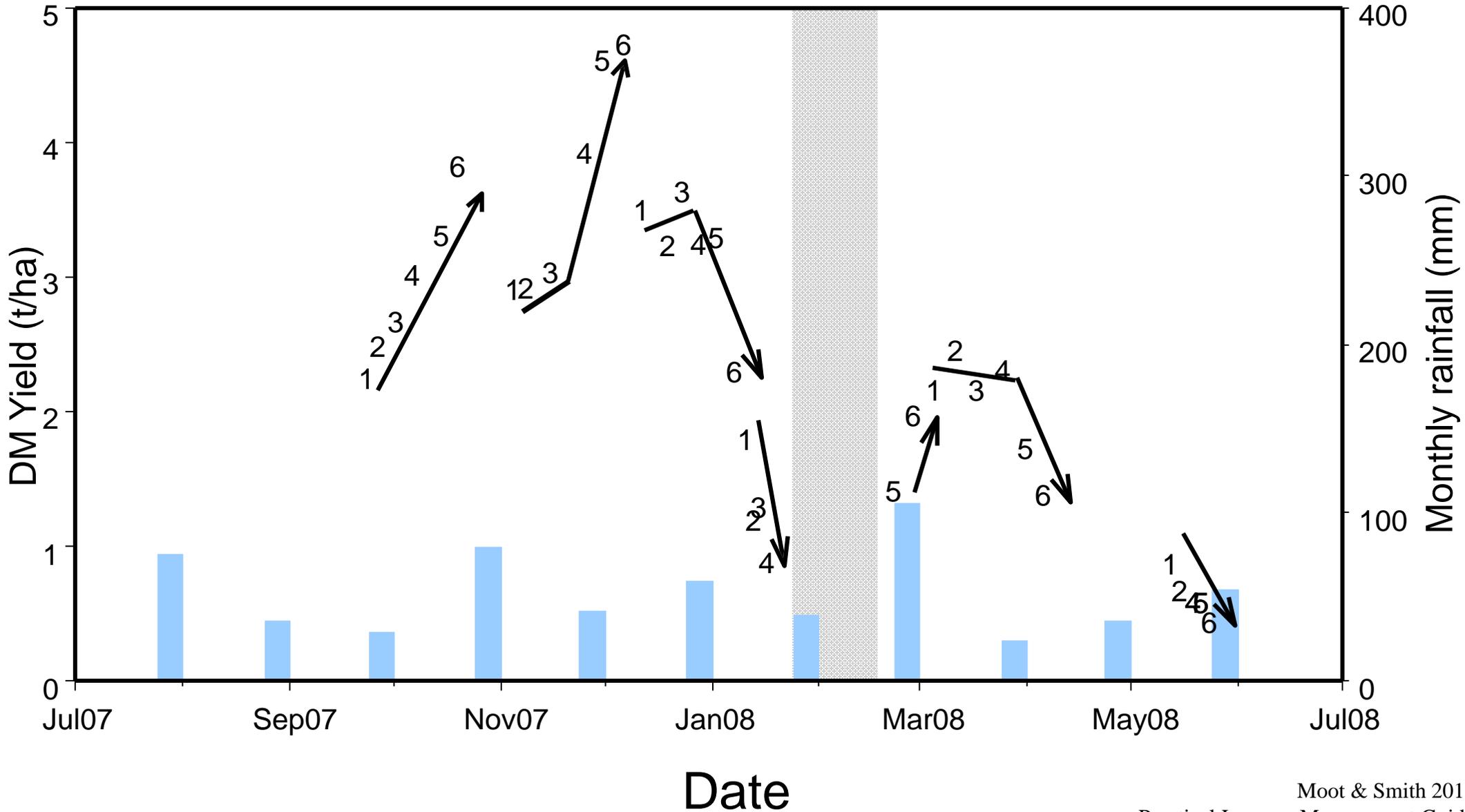


Rotation 2 Pre-graze
Plot 1 (2/11/07, 38 d)
2.9 t DM/ha
35-40 cm tall

Plot 31
Date: 2/11/07
Pre-graze



Grazing Rotations at Lincoln University



Metabolisable energy of lucerne

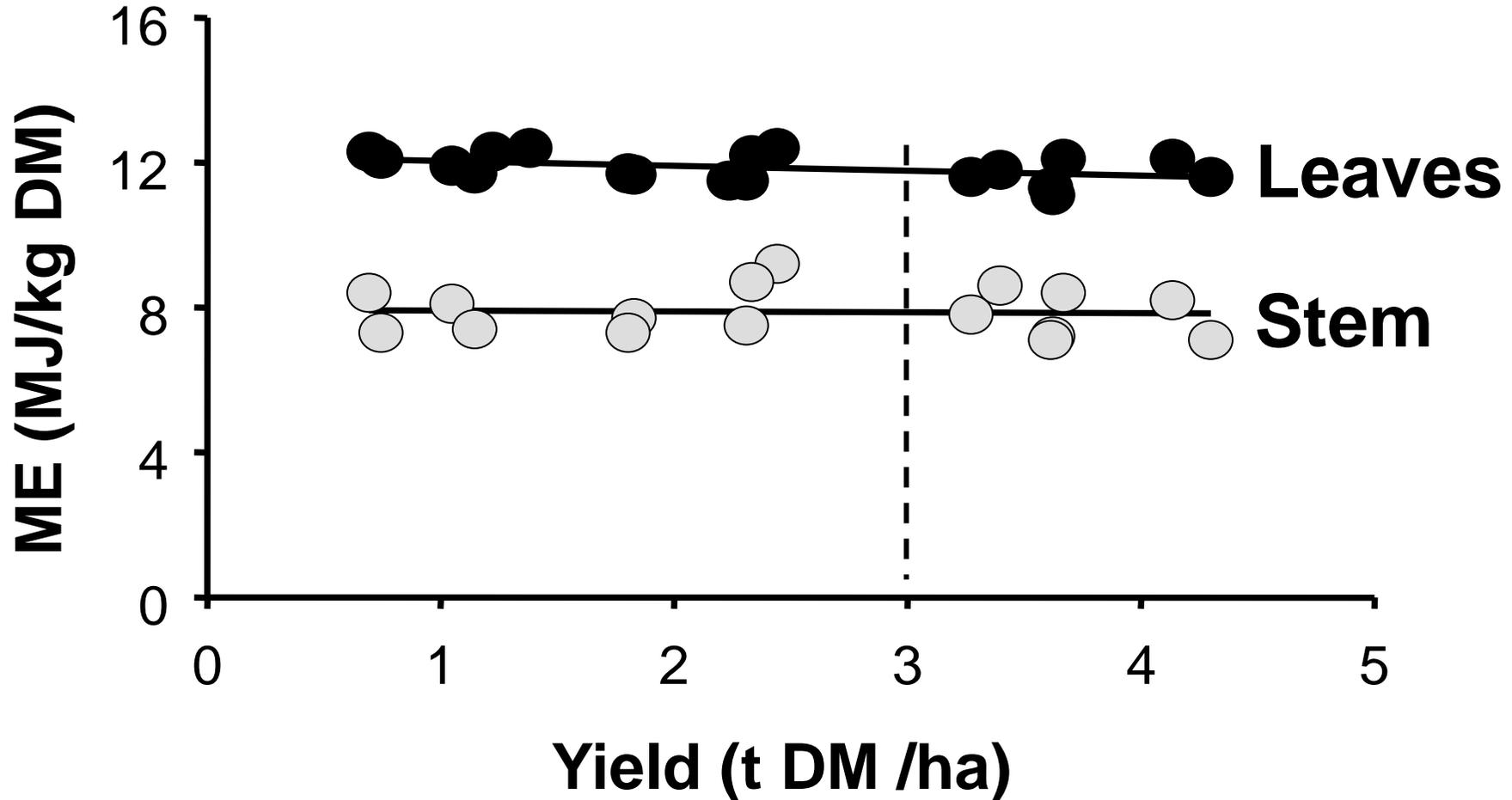


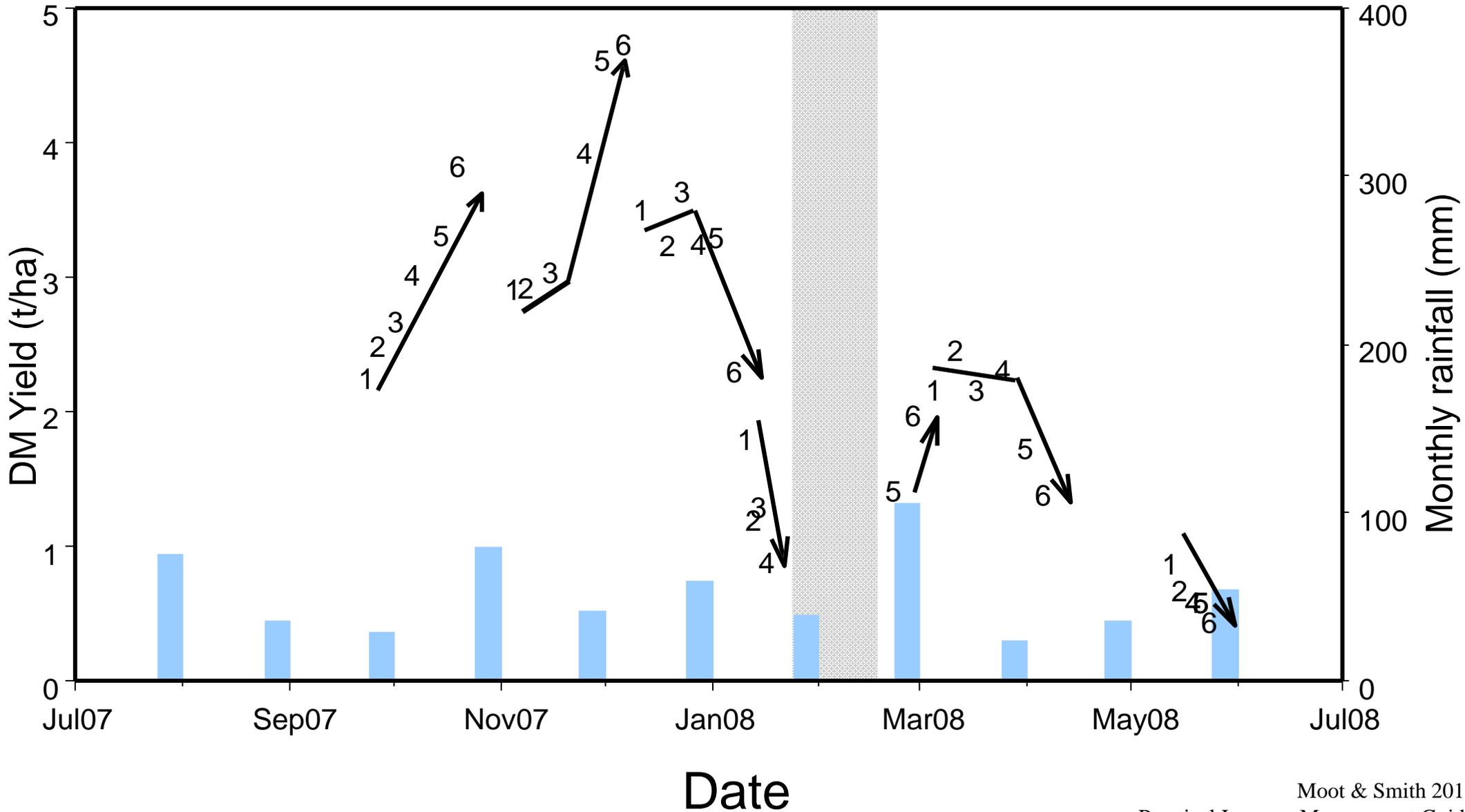


Photo: Bonavaree





Grazing Rotations at Lincoln University





Rotation 4 Pre-graze
Plot 6 (28/2/08) **2.0 t DM/ha produced in 51 d**

Post-graze (4/3/08) **0.6 t DM/ha**
UTILISATION = 70%

Creating a net of opportunity



Any autumn rain grows high quality feed



Seasonal grazing management

Late autumn/winter (May-July)

- hard grazing once growth stops (frost)
 - ⇒ decrease aphid population
- spray for weeds 10-14 days after winter graze
 - grazing/spraying early July
 - nodes developing at low temperatures

3. Animal health

- **Redgut:** problem on high quality feeds – fibre
- **Bloat:** cattle more than sheep – capsules
- **Na def. (0.03%):** salt licks/fence-line weeds/pasture
- Require 0.11% Na - sheep/beef/dairy (13%)

3. Animal health (cont'd)

- **Clostridial bacteria:** 10 in 1 vaccine
- **Cobalt:** vitamin B12 injection
- **Worm haven:** Camping on small area – river edge?
- **Leaf spot in autumn:** avoid flushing on older lucerne
 - new regrowth or tops only are O.K.



Forest conversion 100 000 ha







Ewe hoggets grown on lucerne 54 kg ave





Corriedale 2th flushed on wilting lucerne



Lucerne (is not grass!!!)

- flushing at Bonavaree

04.03.2009

Photo: DJ Moot
Lincoln University



4. Fertilizer

- Higher requirement from cutting than grazing
 - 2% K = 20 kg/ha/t DM removed

- 50% K super = 80 kg/ha/t DM removed

Or

- KCL = 40kg/ha/t DM removed + P and S from super



Photo: DJ Moot
Lincoln University

5. Weed Control

Bad weeds = grasses and tap rooted flat weeds

Never set stock in spring

⇒ stand open for summer annual invasion control:
herbicide before July 1

K super if conserving (soil K > 6)

'Bonavaree' Marlborough
July 2010

Waterlogged





Redrill poorly established areas

Close up of a prairie grass and lucerne mixture



'Bonavaree' Marlborough
July 2010

'Tama' annual ryegrass overdrilled into runout lucerne (12 yrs)



'Tama' annual ryegrass overdrilled into runout lucerne (12 yrs)
- Close up -



Lucerne + cocksfoot – Haka Valley



6. Conservation (high protein)

- Hay – first cut in spring is heaviest
- Crimper/conditioner
 - need rapid moisture loss from stems
- Leaves are the nutritious part
 - bale with dew in evening
- Silage – wilted/chopped
 - inoculant/pasture added to help fermentation

Continuous conservation without prolonged autumn flowering will decrease stand persistence



26/10/2004

Only conserve a true surplus



Marlborough District Council Farming Environment Award 2011

Diverse drought-proofed landscape



SI Farmer of the Year 2010

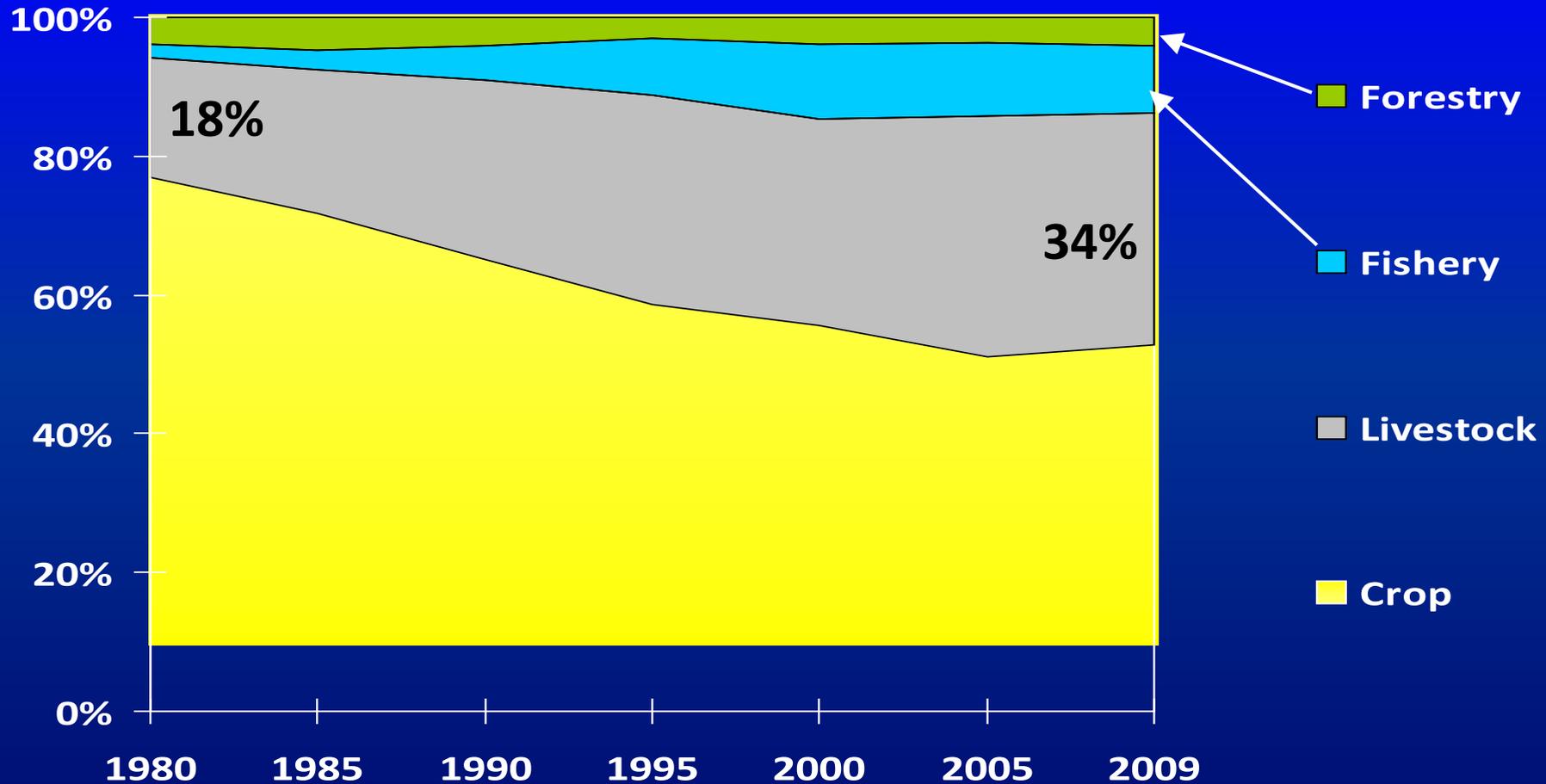
Balansa clover



Gland clover



Shares of output values within agricultural sector 1980-2009, (%)



Meat sector has grown fastest at the expense of crops

Conclusions

- Aim to transform dryland farms to be economically, environmentally and socially resilient
- Require regionally specific technical solutions and ongoing extension
- Nitrogen from legumes is the key to improve pastoral water use efficiency
- Global demand for meat will exceed supply for at least the next decade

Acknowledgements

- Beef & Lamb NZ Ltd/ Pastoral21
- Lincoln University
- MAF Sustainable Farming Fund



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