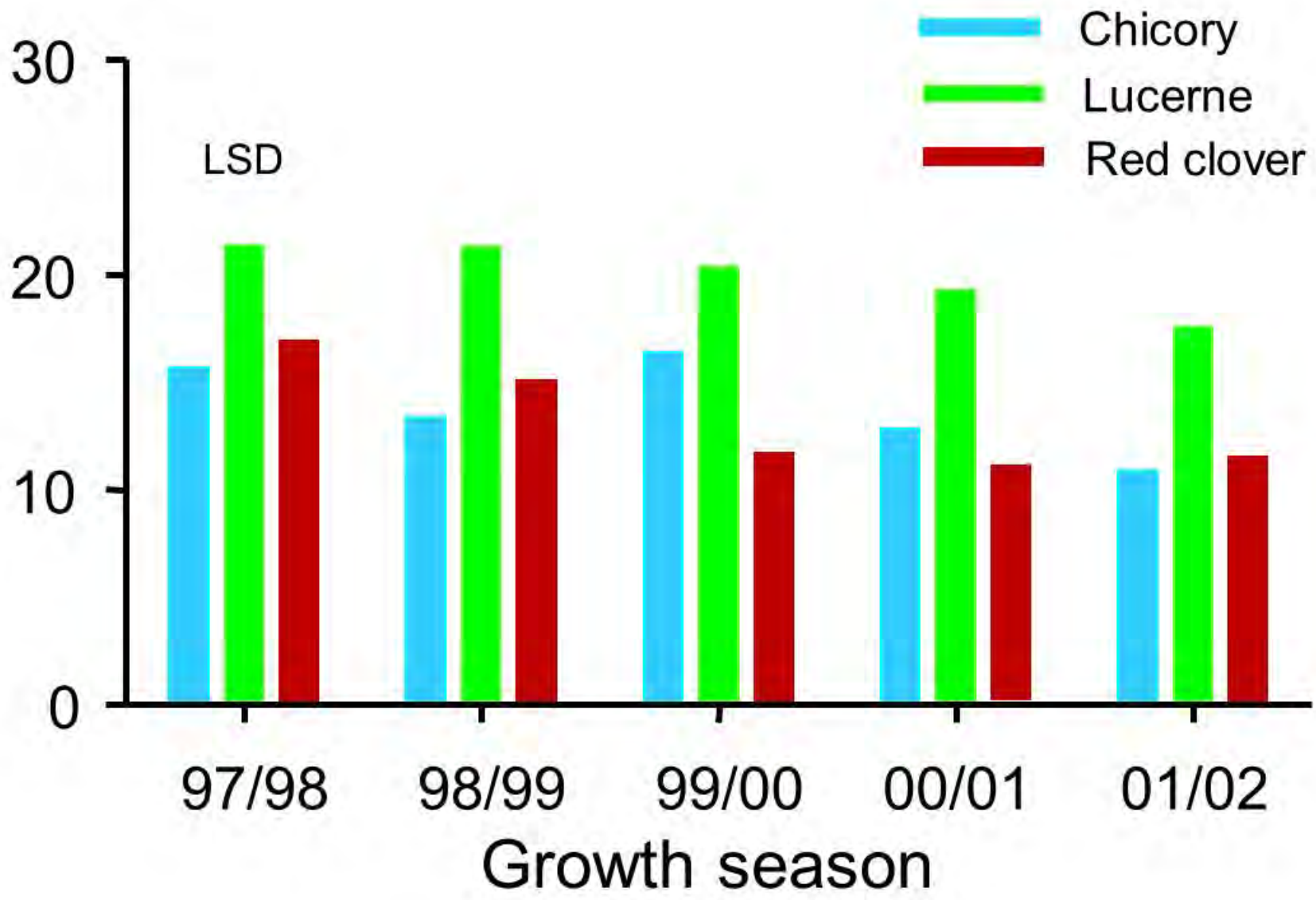
LUCERNE

- agronomy and grazing management

Dr Derrick Moot

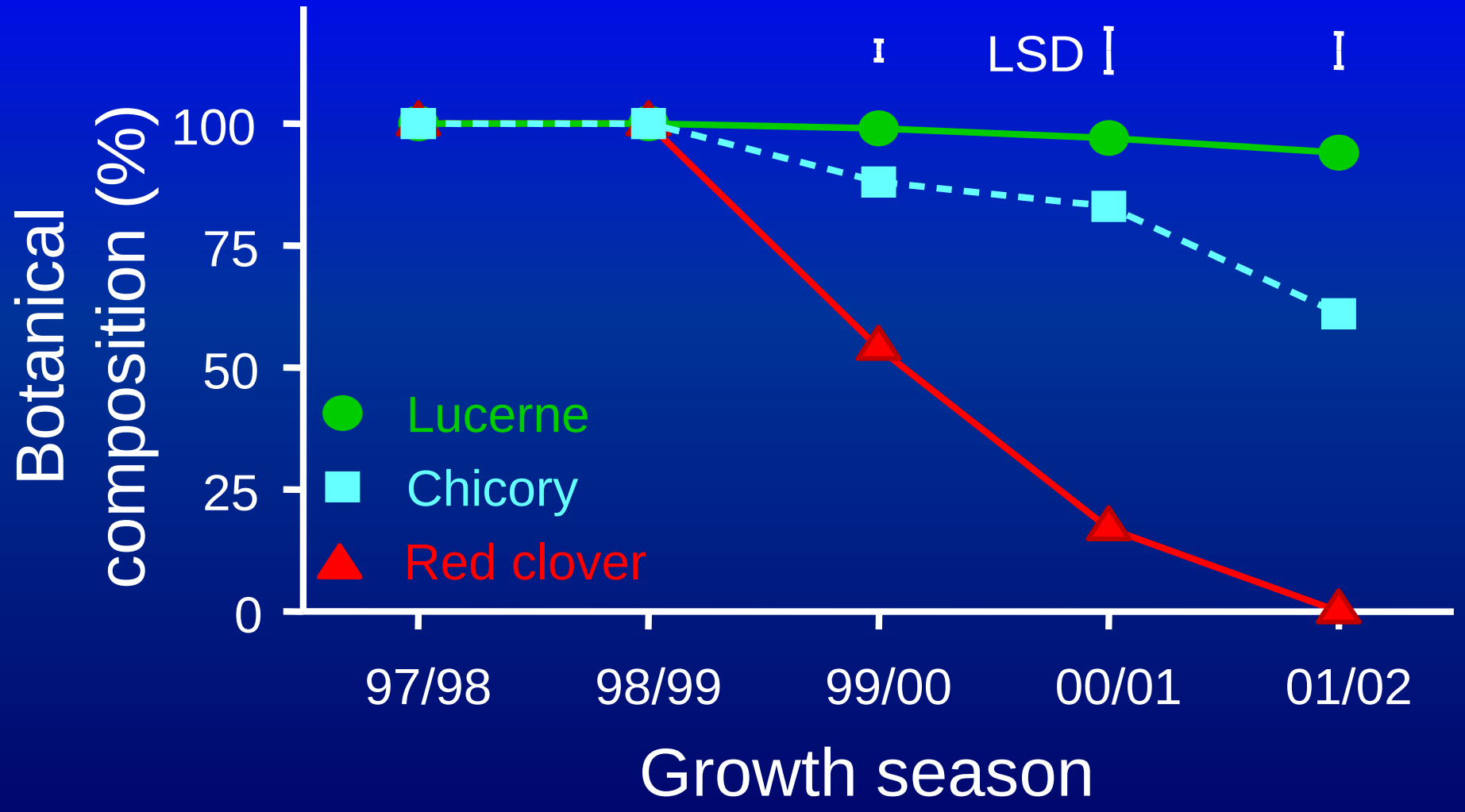
Professor of Plant Science

Annual dry matter yields



Source: Brown *et al*. 2005

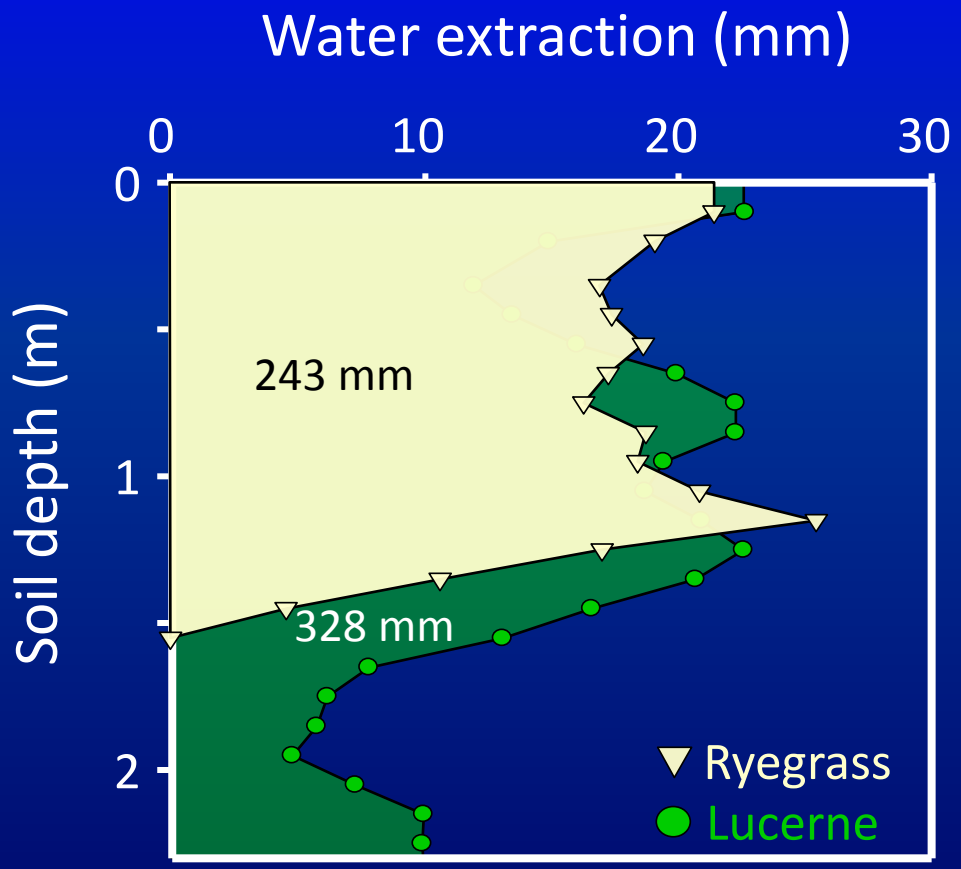
Persistence



Brown *et al*. 2005

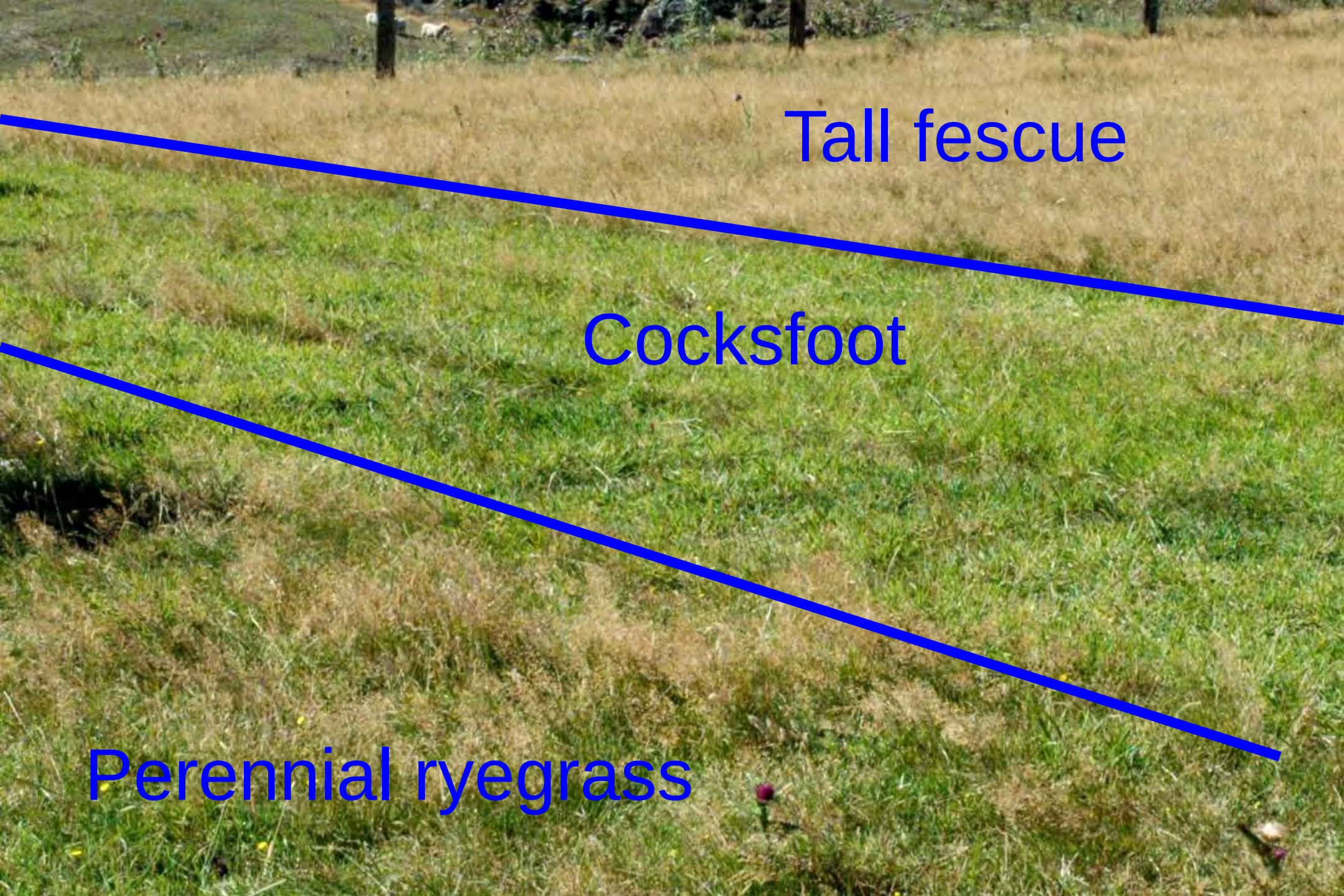
Ryegrass/clover vs. Lucerne

Soil water extraction: Species



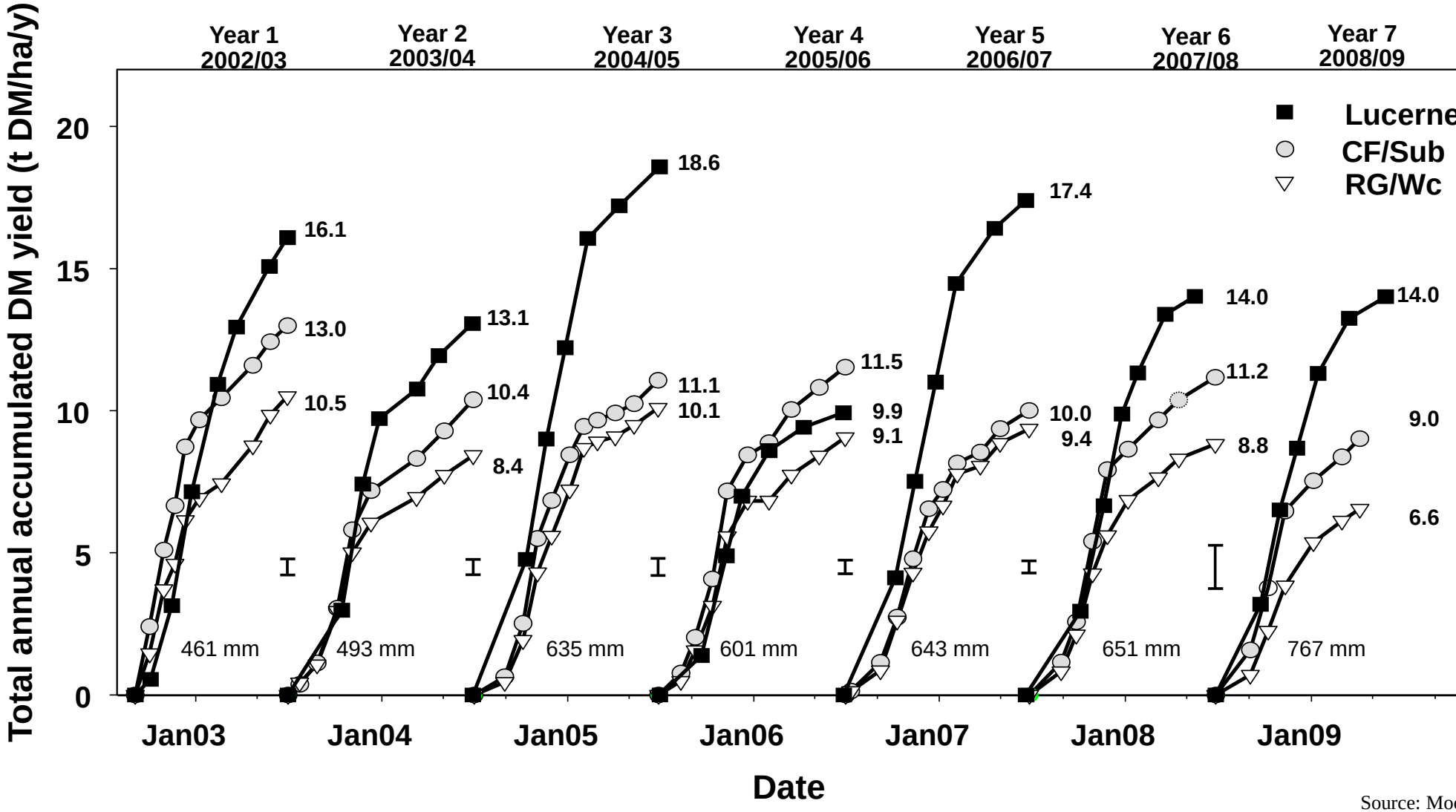
Lucerne has 85 mm more available water

Moot *et al*. 2008


Tall fescue
Cocksfoot
Perennial ryegrass

‘MaxClover’

MaxClover - Lincoln University

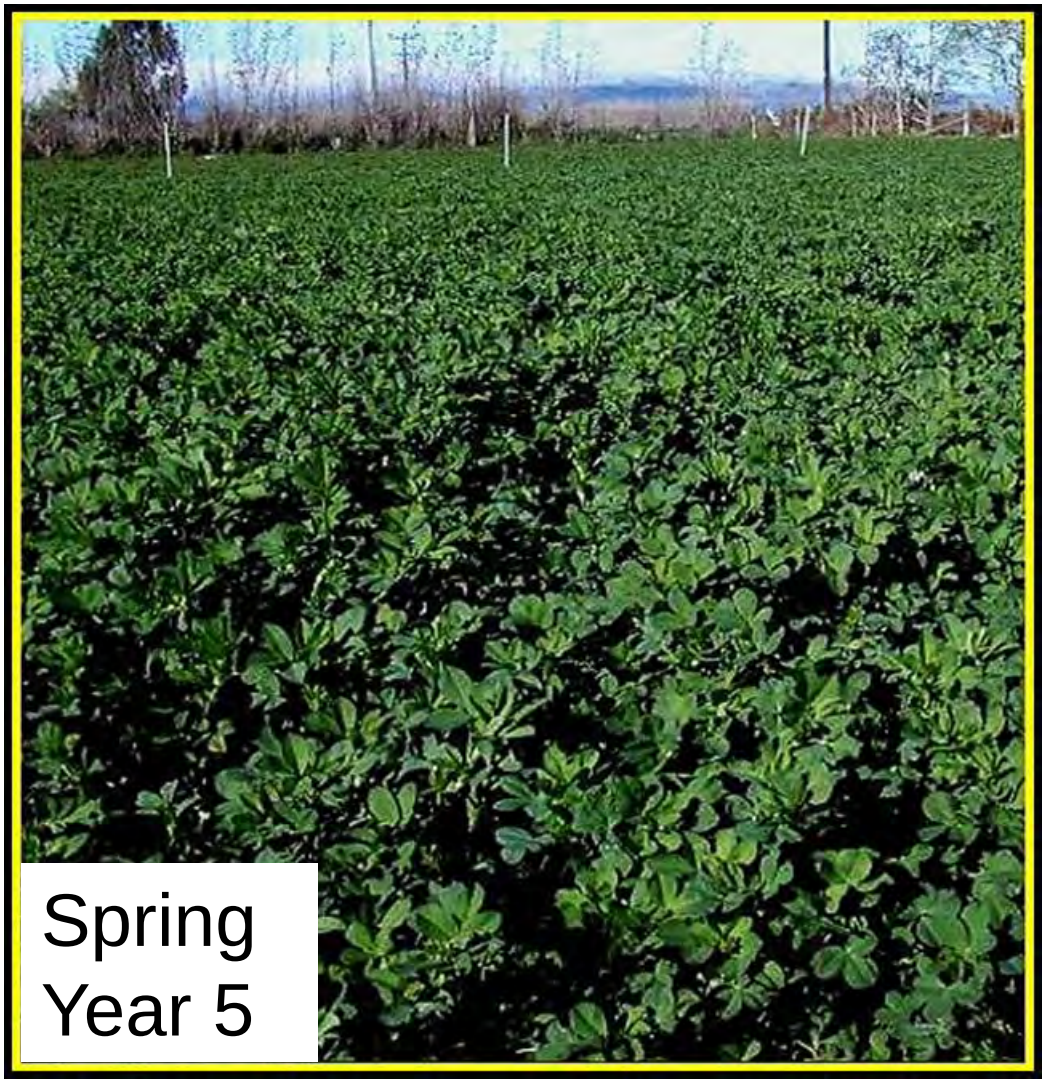


Source: Moot 2012

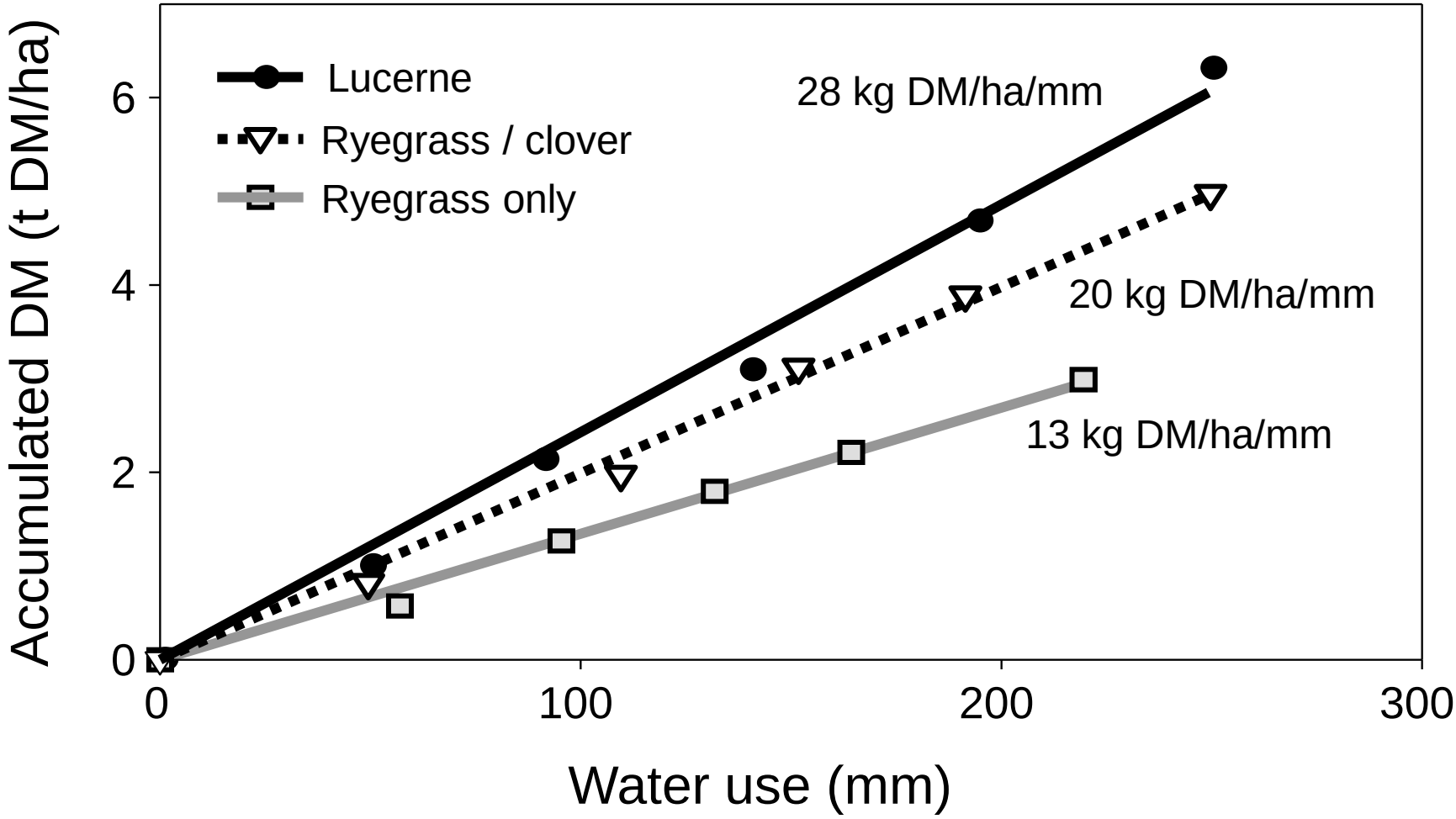
RG/Wc pastures

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

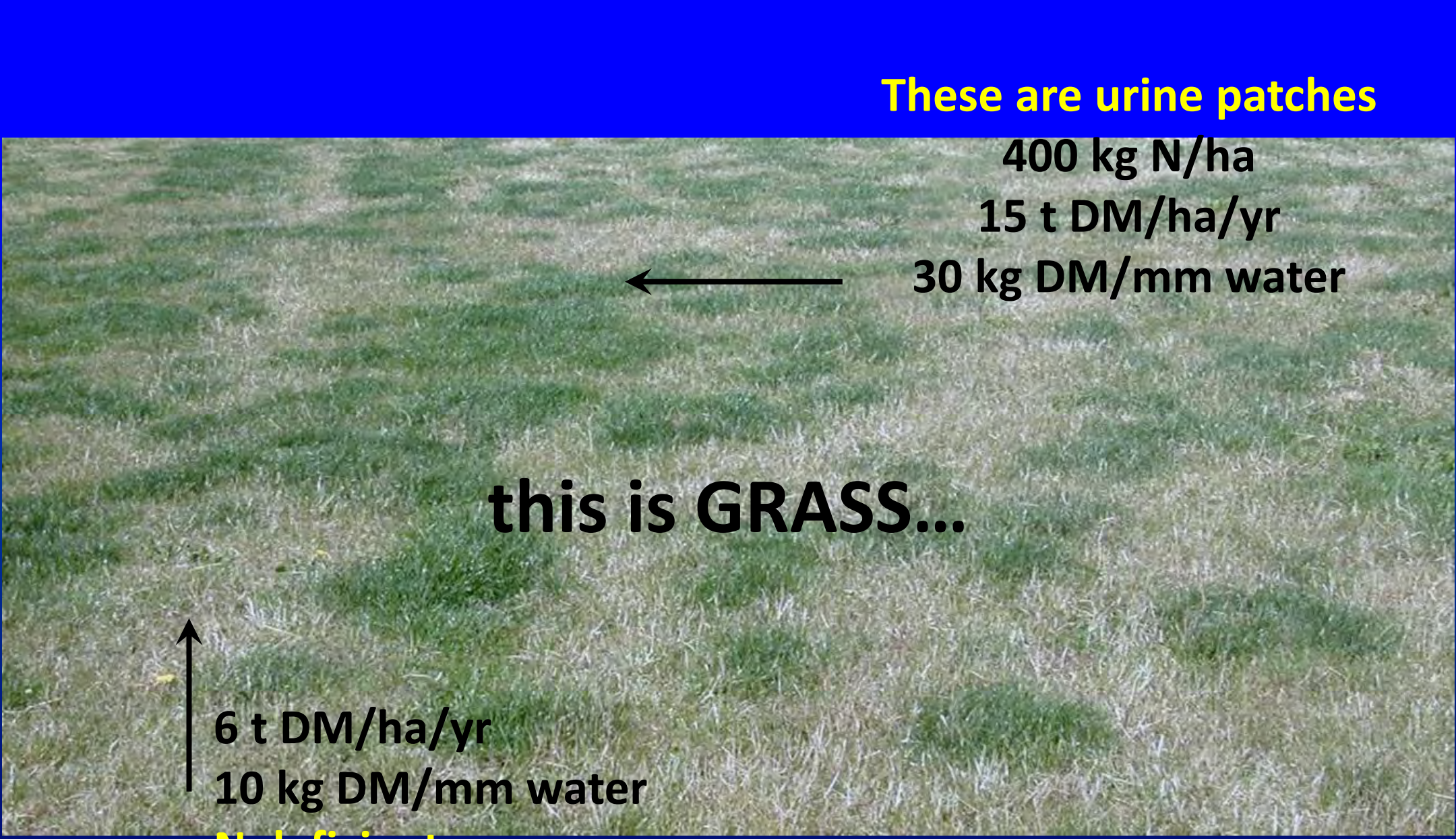
Lucerne pastures



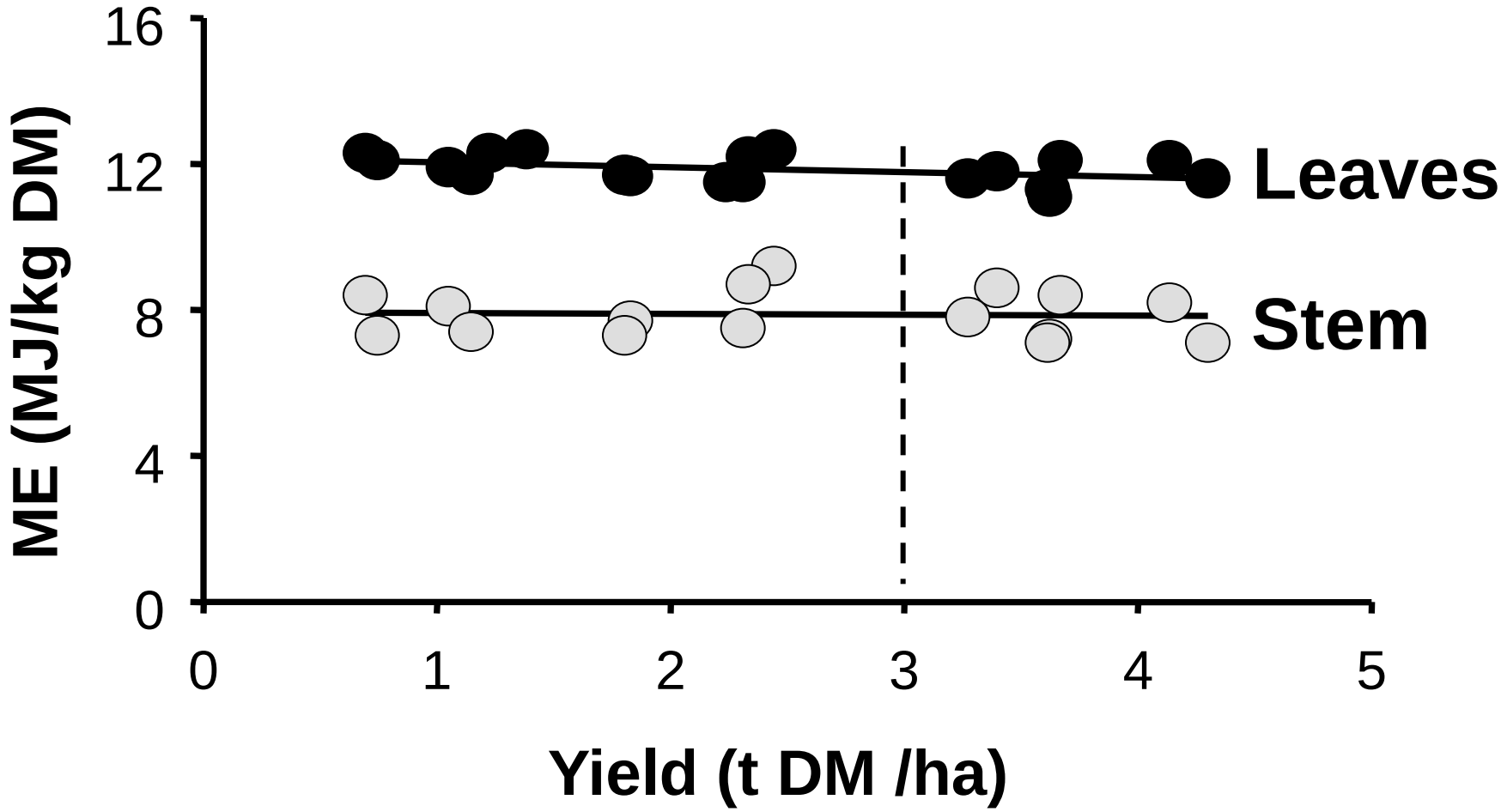
Spring WUE: legume = (nitrogen)



Source: Moot *et al*. 2008


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

Metabolisable energy of lucerne



Source: Brown & Moot 2004

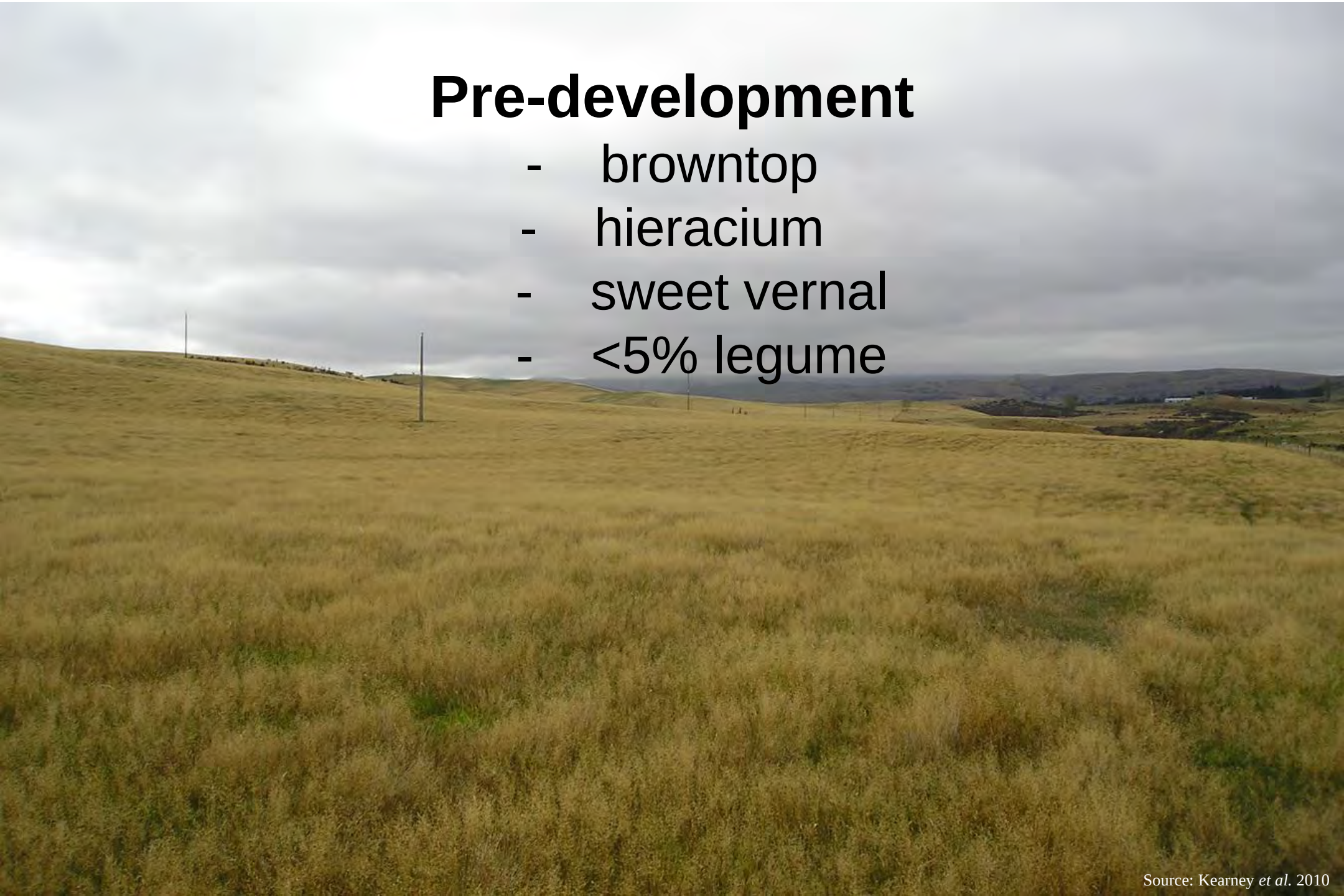
1. Lucerne establishment

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?

Pre-development

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



Source: Kearney *et al.* 2010

Source: Kearney *et al.* 2010

Lime and Fertiliser Application

Lime 3-5 ton/ha

Fertiliser 250-500kg/ha

Source: Kearney *et al.* 2010

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

	pH	Olsen P (μg/ml)	Potassium (QTU)	Sulphur (μg/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

Source: Kearney *et al.* 2010

Autumn Spraying

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

Key Results

- Conserve soil moisture
- Kill mass root systems

Source: Kearney *et al.* 2010

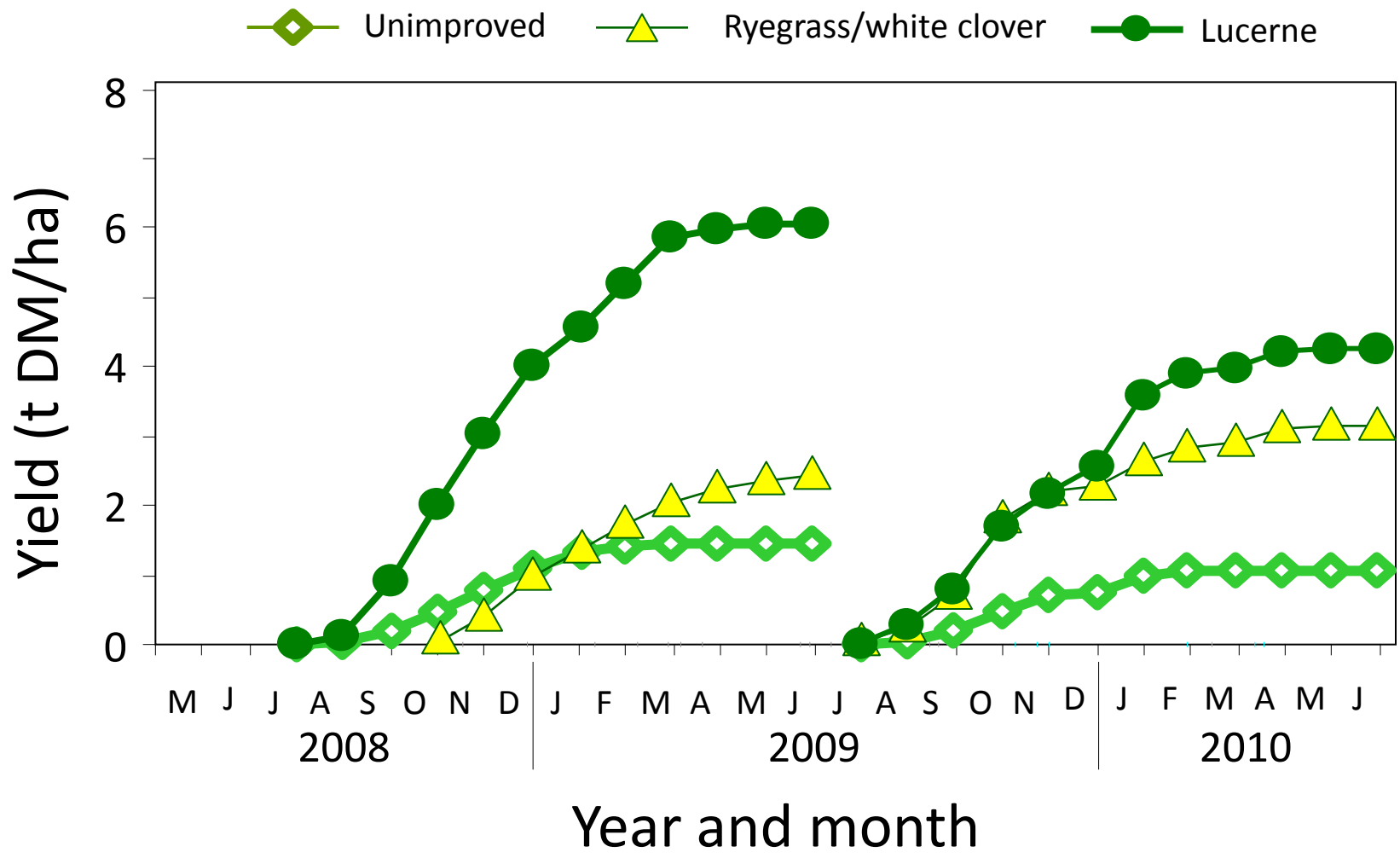

2nd Spray – Spring
Glyphosate, insecticide, penetrant
Result from Autumn spray, photo taken 1 November 2010
Source: Kearney *et al.* 2010

Drilling seed with fertiliser
Direct drilling = seed + fertiliser

Source: Kearney *et al.* 2010

Source: Kearney *et al.* 2010

Pasture growth



Kearney *et al.* 2010

Doug and Fraser Avery “Bonavaree”
1100 ha 30% lucerne (65% of easier country)

Seasonal grazing management

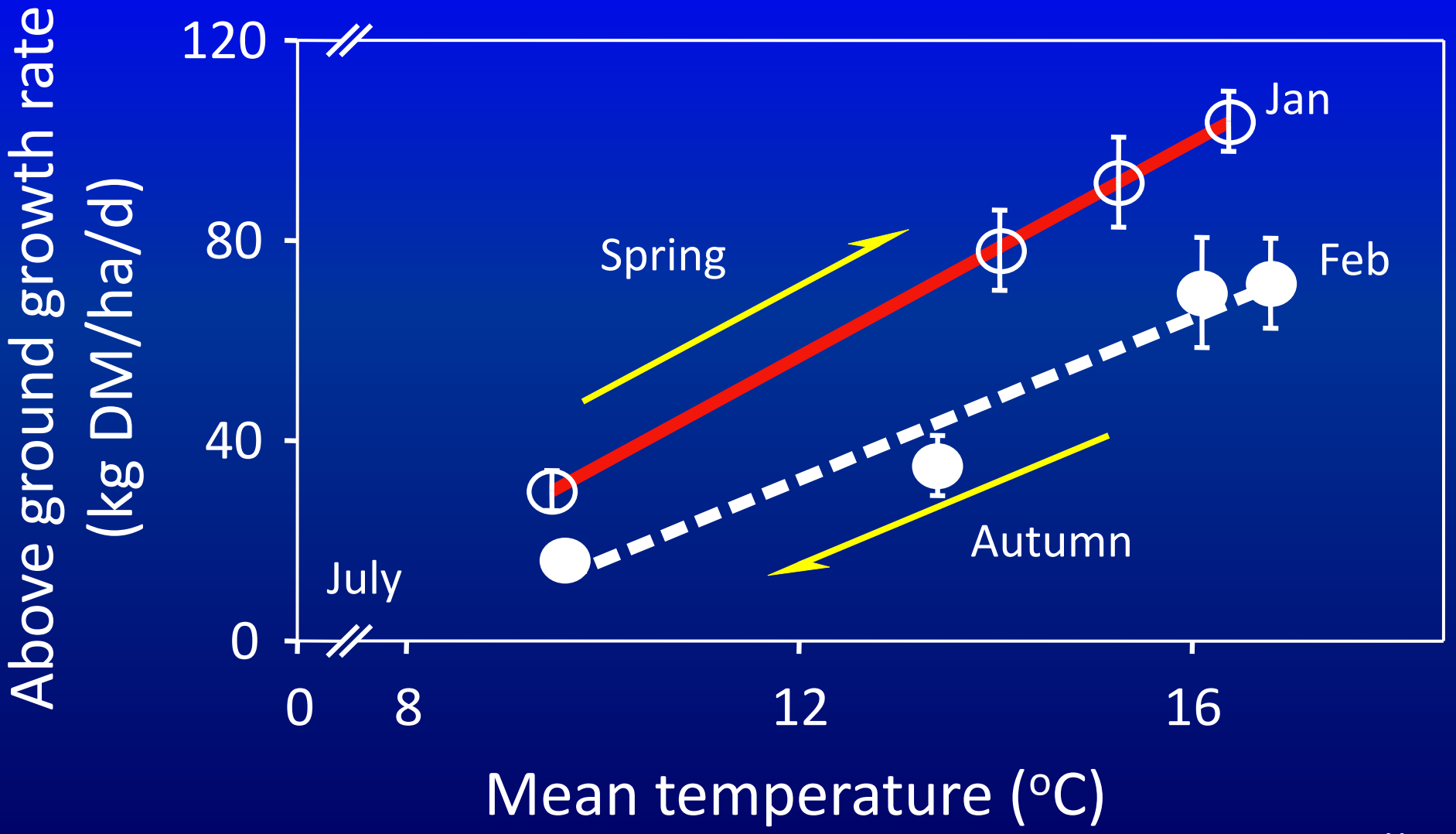
Spring

- 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

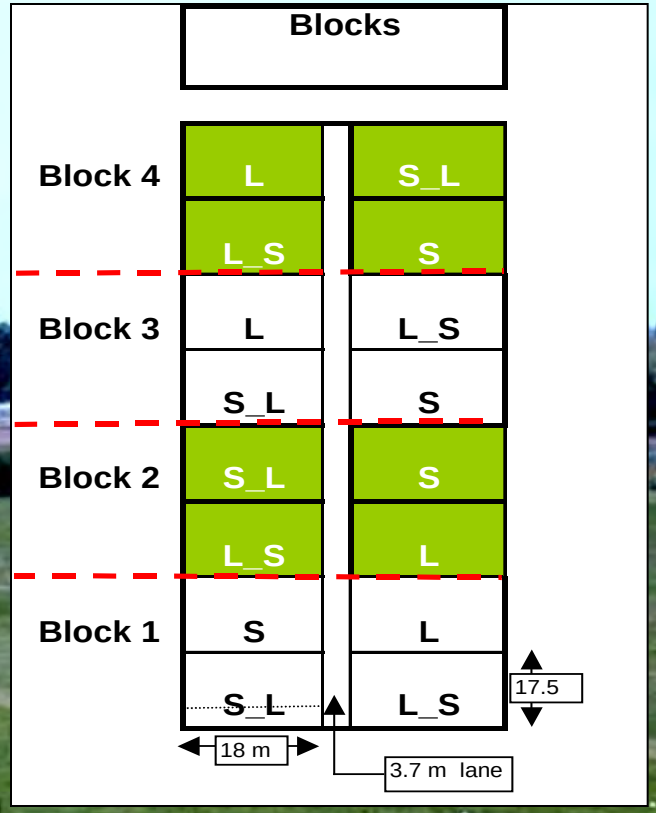


Moot *et al*. 2003

What's going on down there?

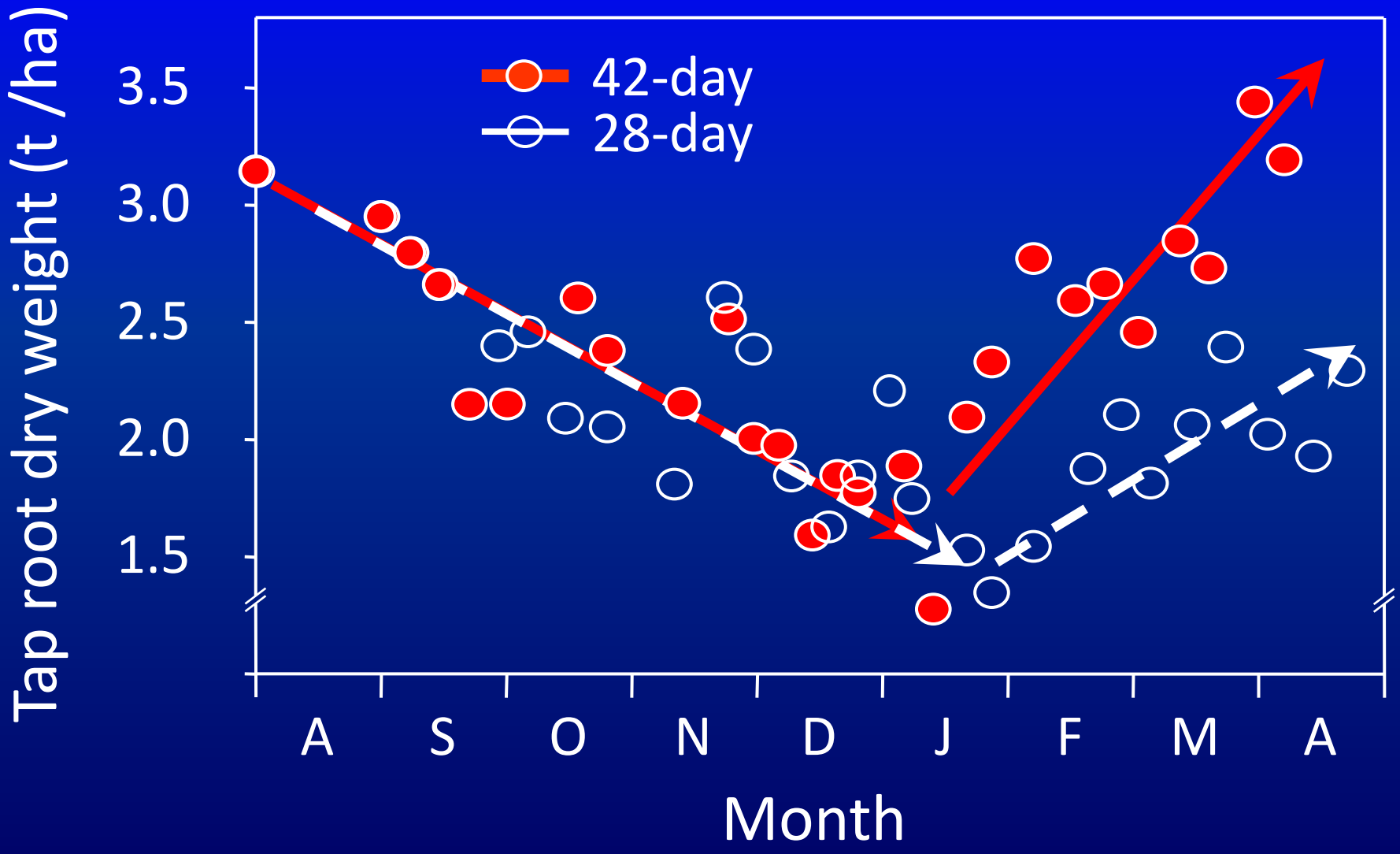
Experiment 2

38 days resting
4 days grazing



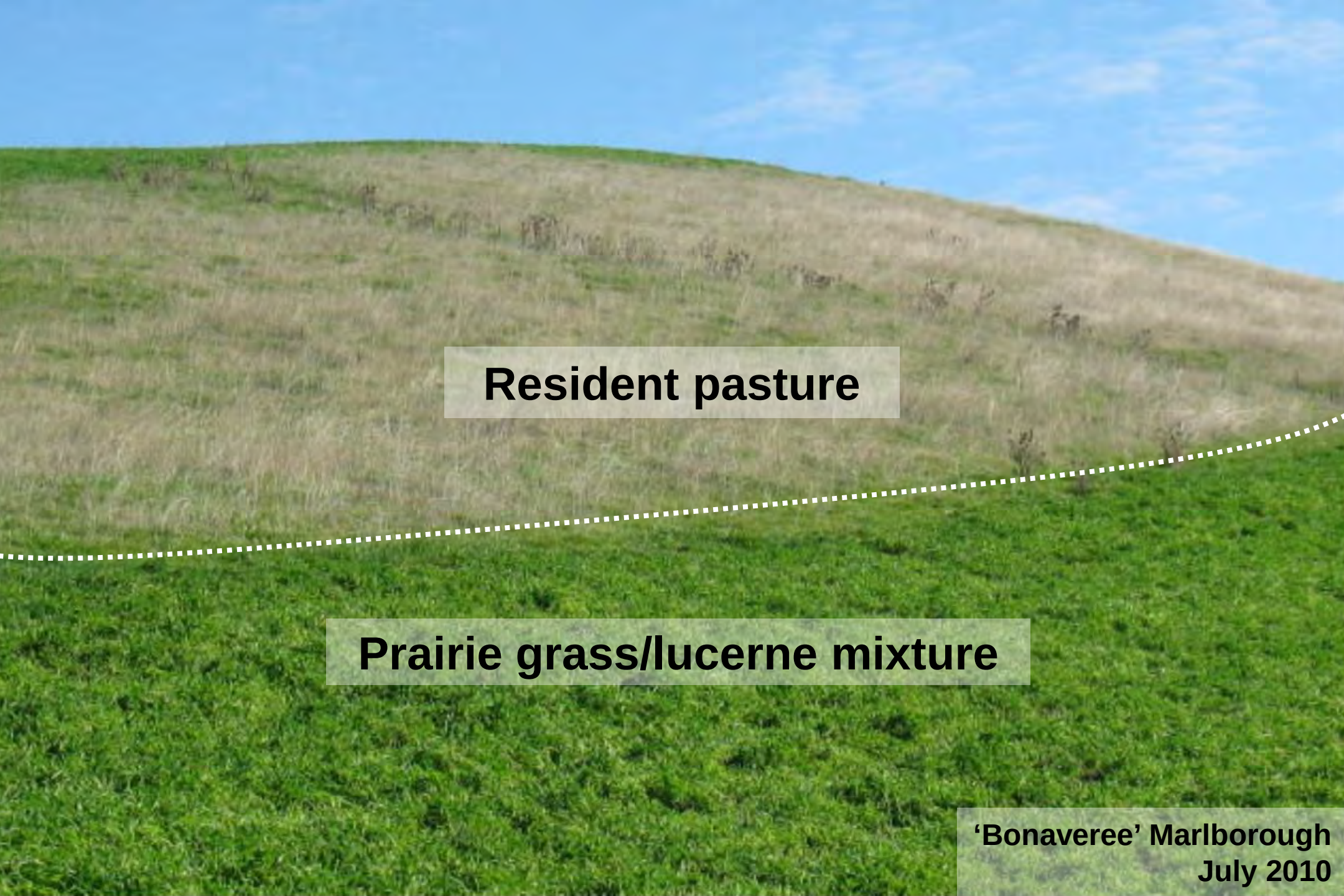
25 days resting
3 days grazing

Partitioning to roots



Moot *et al*. 2003

Photo: Edmar Teixeira
Lincoln University


Resident pasture
Prairie grass/lucerne mixture
‘Bonaveree’ Marlborough
July 2010

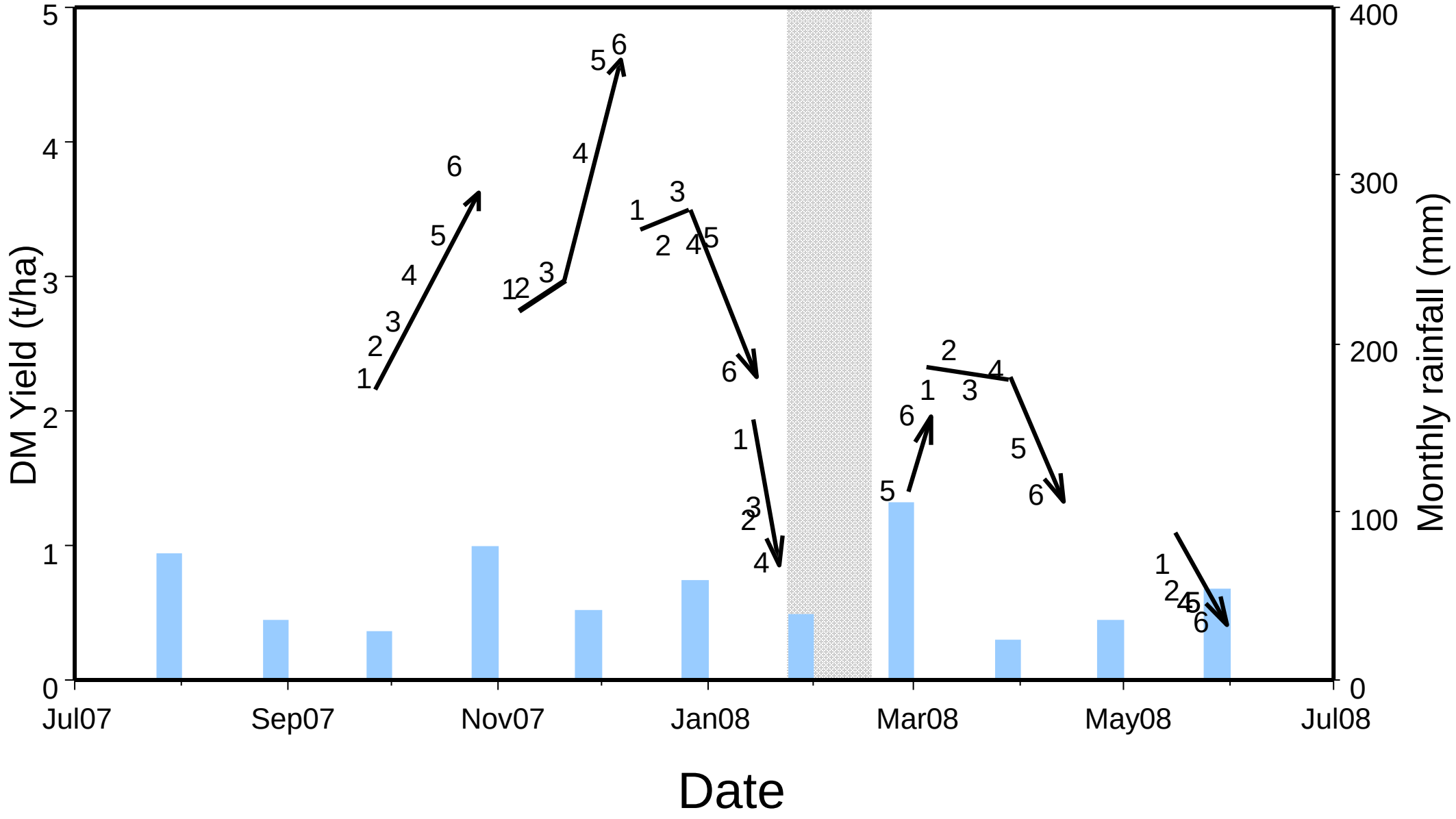
‘Bonaveree’ Marlborough
July 2010

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

Grazing Rotations at Lincoln University




8 Aug 2001
cm
7
6
5
4
3
2
1
0
Photo: H.E. Brown
Lincoln University

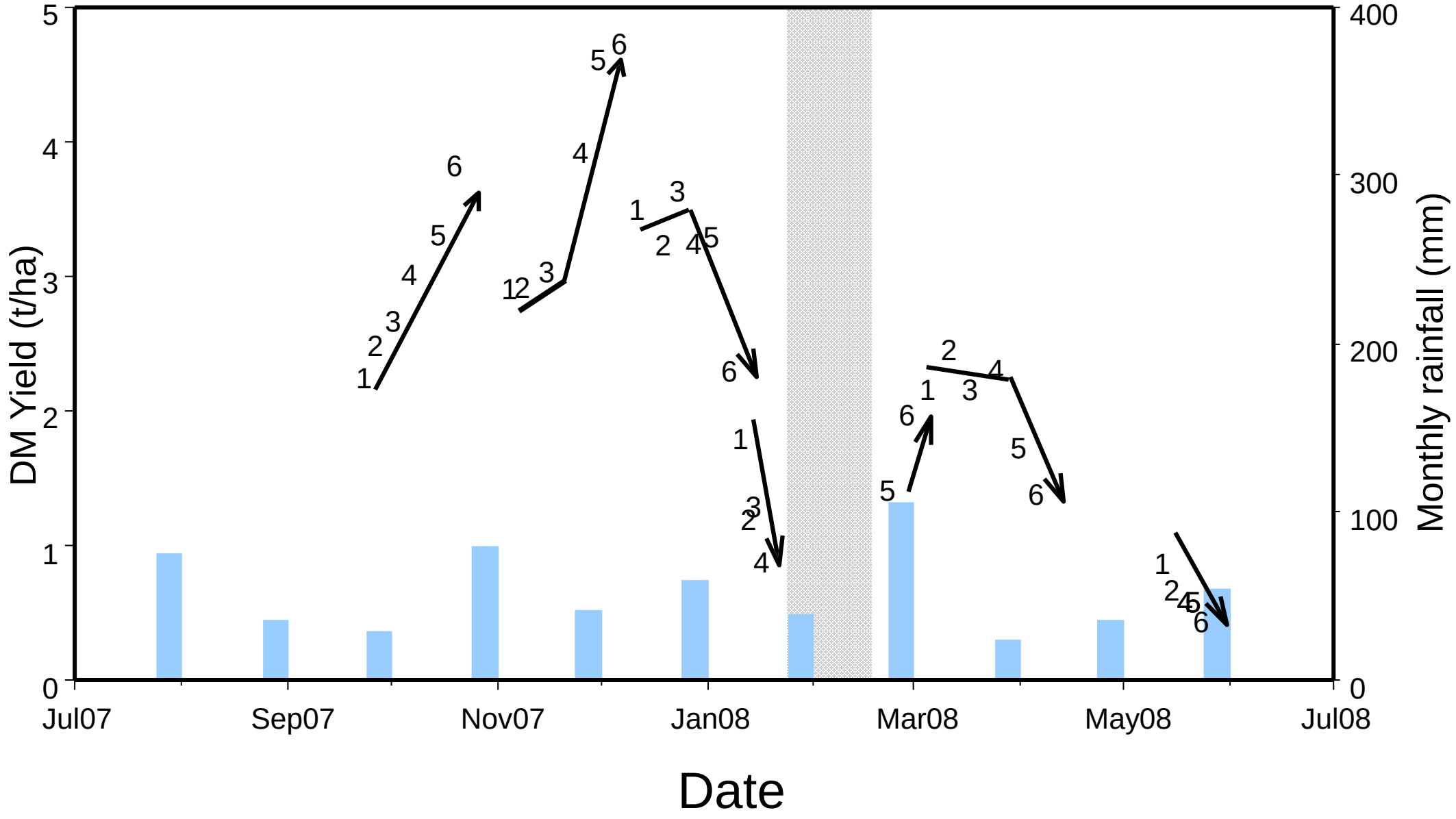

22 Aug 2001
cm
13
12
11
10
9
8
7
6
5
4
3
2
1
Photo: H.E. Brown
Lincoln University


12 Sep 2001
cm
18
16
14
12
10
8
6
4
2
0
Photo: H.E. Brown
Lincoln University


60 -
50 -
40 -
cm
30 -
20 -
10 -
0 -
3 Oct 2001
Photo: H.E. Brown
Lincoln University

What else to feed

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%**

Seasonal grazing management

Late autumn/winter (*May-July*)

- hard grazing once growth stops (frost)
  $\Rightarrow$ 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%)

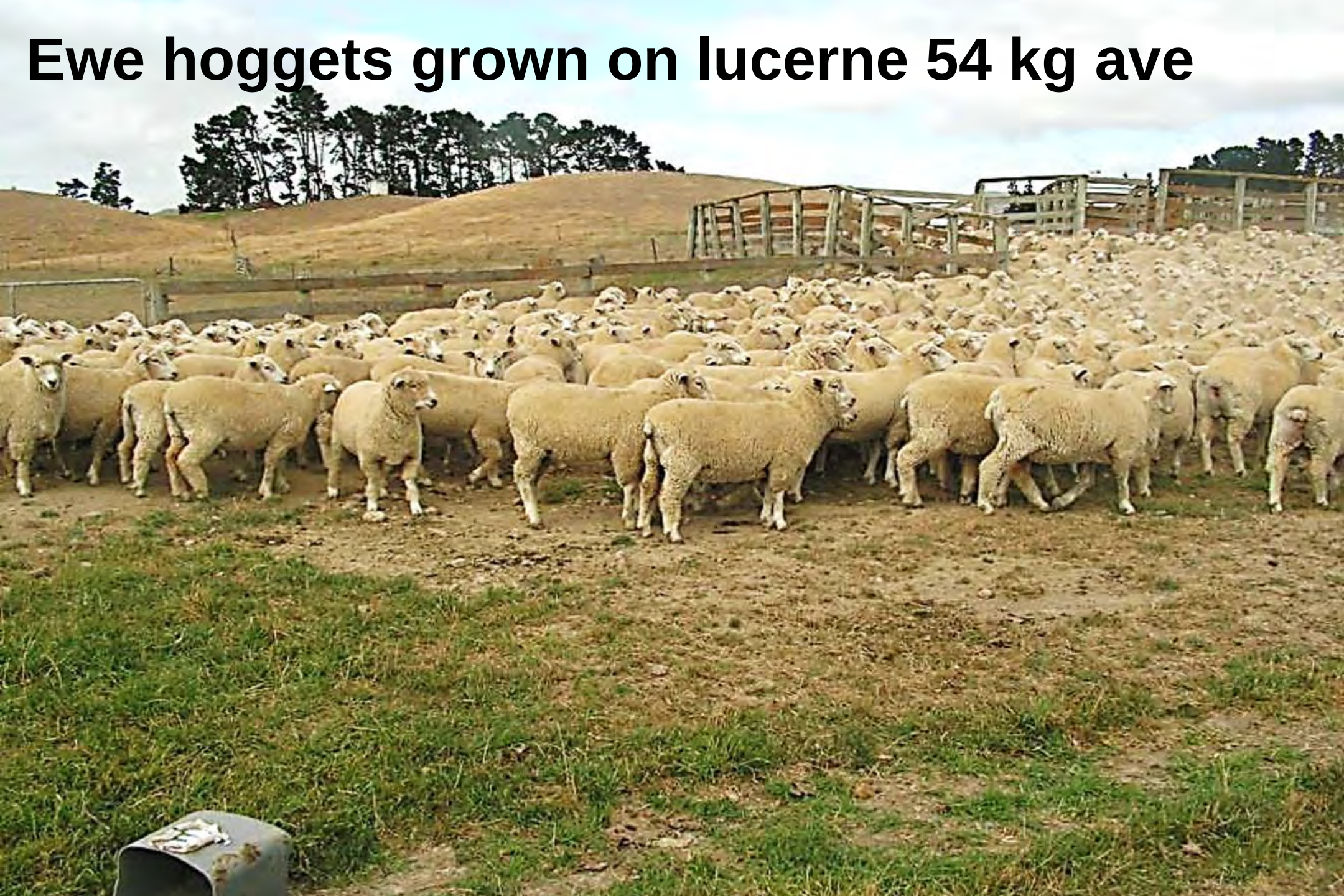
3. Animal health (cont'd)

- **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

Clay Downs South Canterbury

Ewe hoggets grown on lucerne 54 kg ave



Corriedale 2th flushed on wilting lucerne


Lucerne (is not grass!!!)
- flushing at Bonaveree
04.03.2009

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

5. Weed Control

Bad weeds = grasses and tap rooted flat weeds

Never set stock in spring

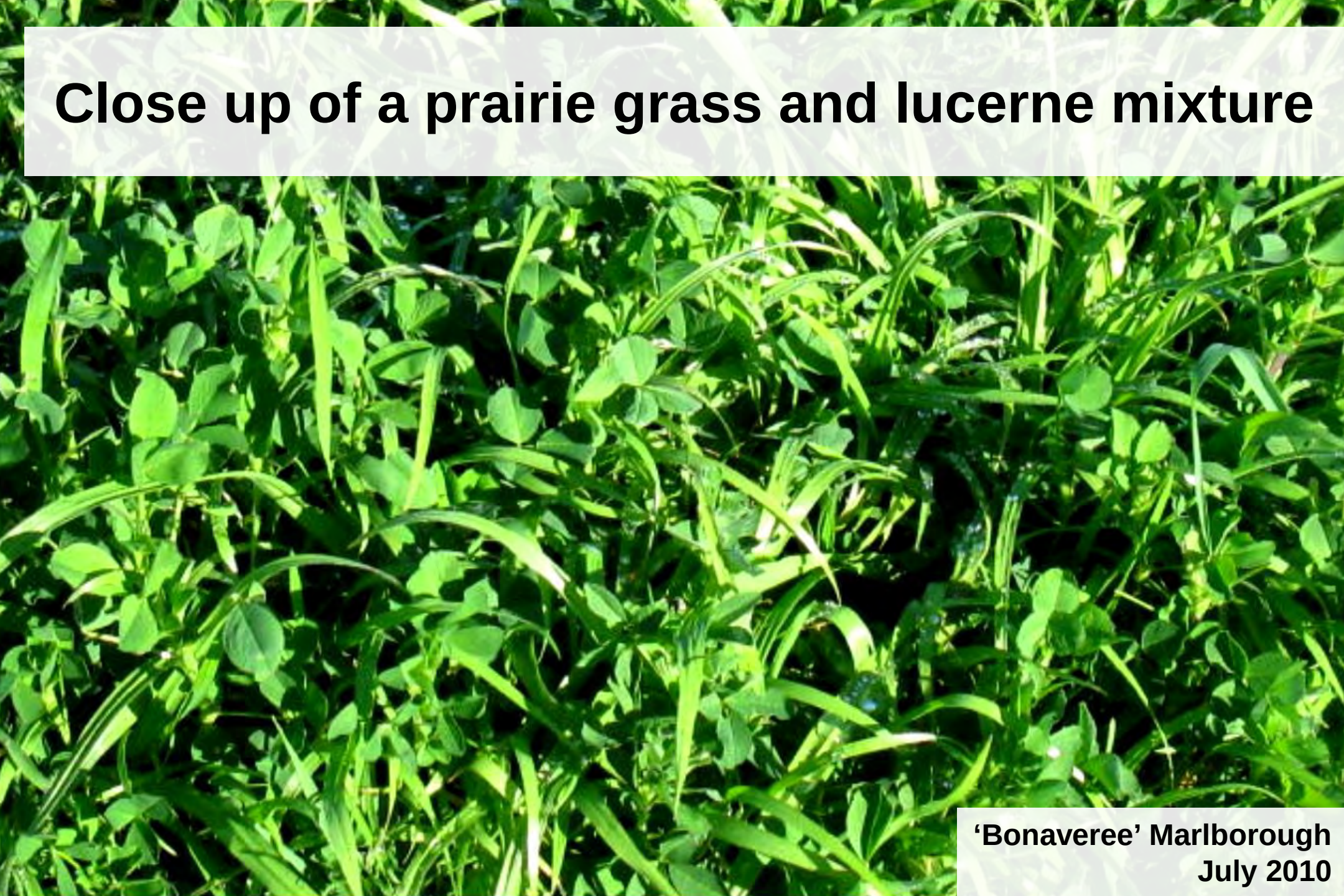
$\Rightarrow$ stand open for summer annual invasion control:
herbicide before July 1

K super if conserving (soil K > 6)


‘Bonaveree’ Marlborough
July 2010
Waterlogged


Redrill poorly established areas

Close up of a prairie grass and lucerne mixture



‘Bonaveree’ 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

Balansa clover

Gland clover

Diverse drought-proofed landscape

SI Farmer of the Year 2010

Marlborough District Council Farming Environment Award 2011

Acknowledgements

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

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Lucerne: agronomy & management

Professor Moot gave this presentation at:

Ongaonga, Hawkes Bay

On:

17 August 2011