Finding a new way forward at Inverary

A pasture and livestock based review

Reflective farming

Listening to what your farm is willing to tell you

“ Saying that a good stockman shouldn’t need all the technology at his disposal - scales, feed budgets, technical advisors or record anything, is like telling someone not to take their car to town because they are a good pedestrian”

Inverary Station

Inverary Station - land tenure

Pastoral lease	3500 ha
Private lease	140 ha
Freehold	610 ha
Total area	4250 ha

Tenure review – tried and failed

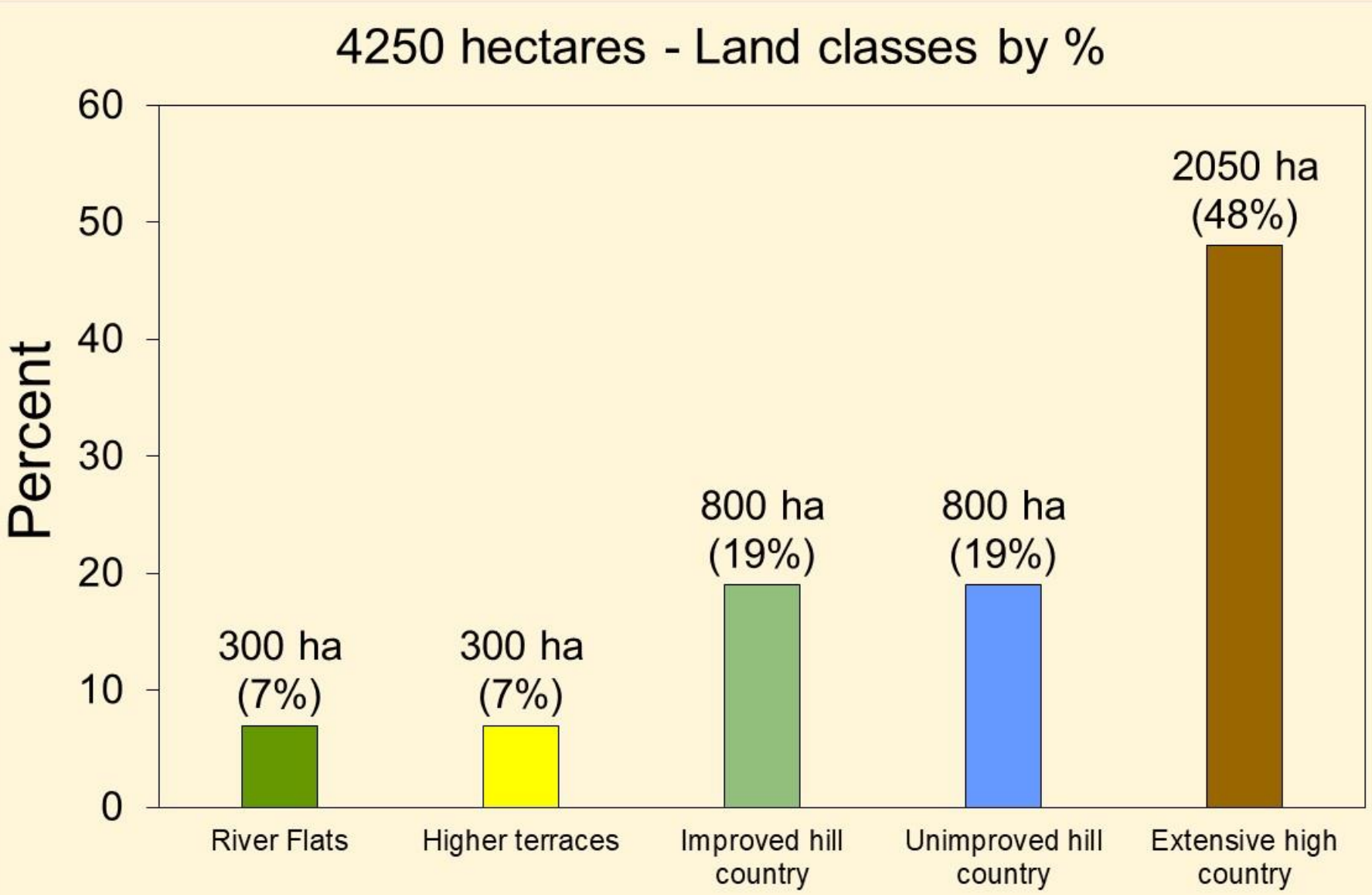
Inverary Station - Winter stock numbers

Ewes	5500	(135-140% lambing)
Ewe hoggets	1500	(half to be mated – 90% lambing)
Other	100	
MA cows	670	(90% calving)
R2 Heifers	155	
Calves	400	
Other	50	

Inverary Station – hill country development

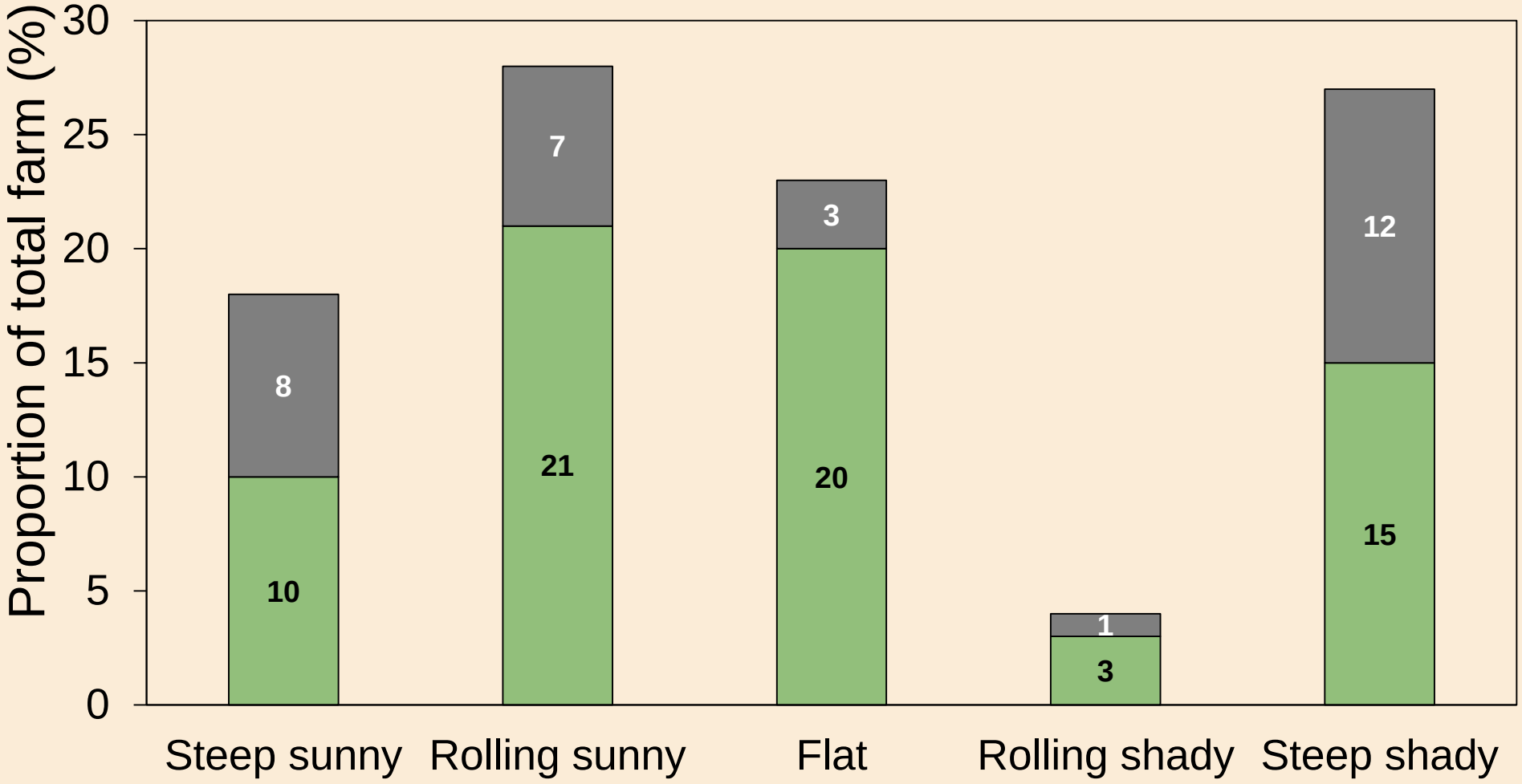
Our problem

- Early experience with legumes
- Story began with sale of CL – two different views
- Proposal to take Inverary apart
- The information would suggest the strategy – not an answer looking for a question Tony Ryan
- We had outstanding stock info – 10-15 years of info (go back to my title (able to listen to what they had to tell us) more later
- BUT very little pasture information – if we wanted it we had to create it ourselves
- The first step was to separate the property into some broad categories and identify where the problem was occuring


4250 hectares - Land classes by %
Percent
60
50
40
30
20
10
0
300 ha (7%)
300 ha (7%)
800 ha (19%)
800 ha (19%)
2050 ha (48%)
River Flats
Higher terraces
Improved hill country
Unimproved hill country
Extensive high country

Proportion of land classes available for grazing

69% grazeable 31% scrub, shingle etc



Pasture cage measurement programme

35 cages - What are our pastures telling us?

Cage cut programme

- Three year programme with up to 35 pasture cages

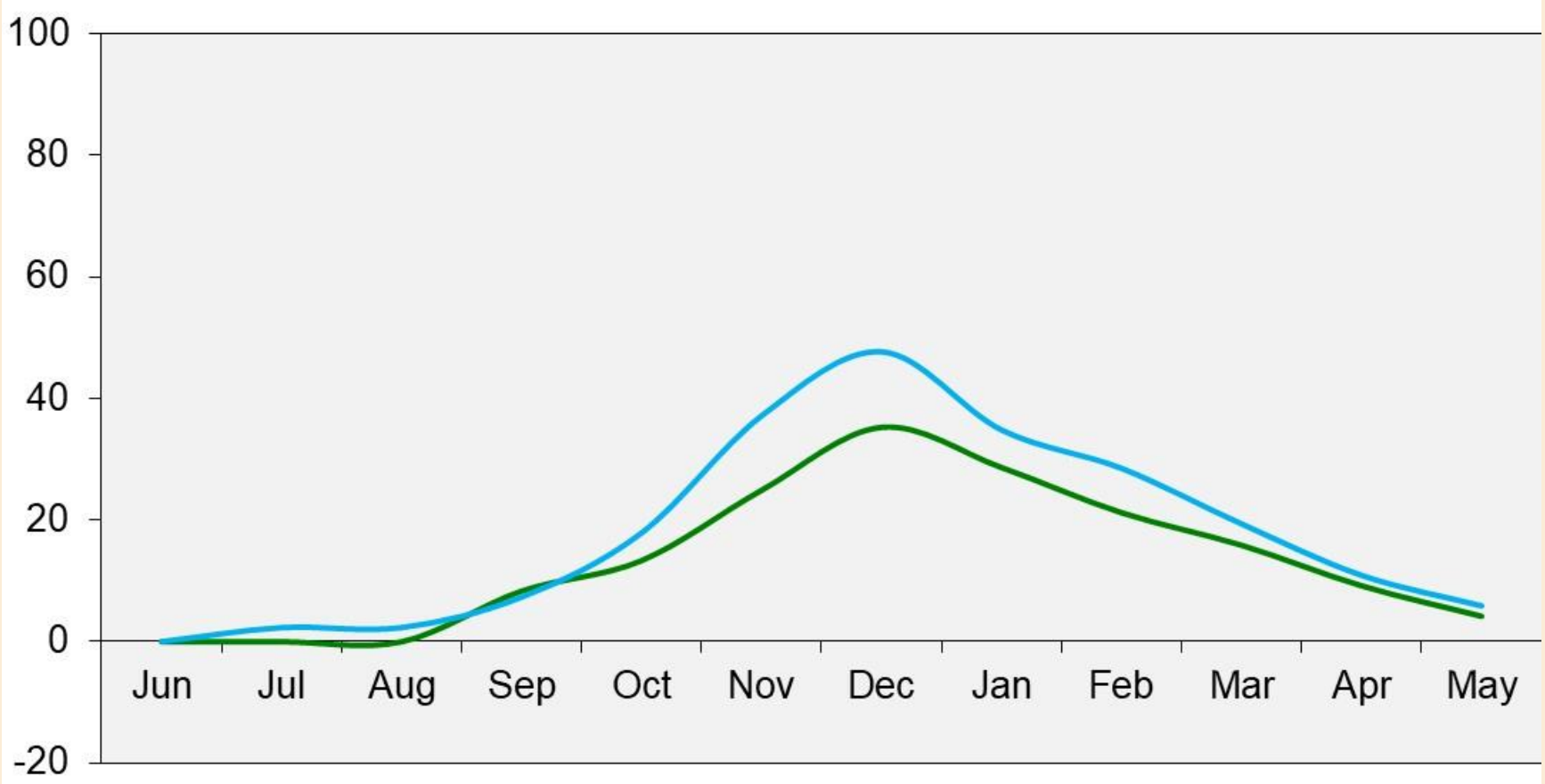
- Cut at six weekly intervals except winter

  - Early spring + late spring
  - Early summer + late summer
  - Early autumn + late autumn’
  - Winter

  - Weighed, dried, pasture composition and ME

Available pasture growth profile - kg DM / day

Improved and unimproved hill



Livestock monitoring – StockCare programme

We condition score our ewes 8 x's a year

1	2	3	4	5
Emaciated	Underweight	Just right	Overweight	Obese

Objective:

85% of our ewes at CS 3, four years out of five

Livestock monitoring – StockCare programme

What our livestock reflecting to us?

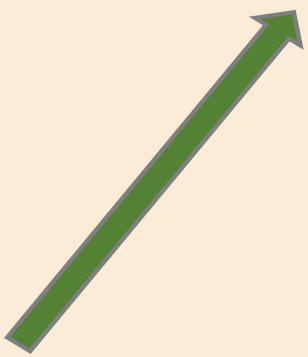
- The destructive pattern of fluctuating of body weight and condition

- The cost of remedial feeding

What our livestock are telling us about their nutrition?

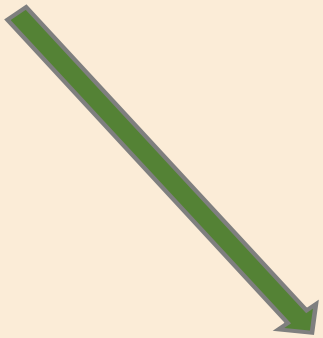
Spring

Grows too little when we really need it



Summer.

Grows too much when don't really need it



Autumn and winter

Becomes so unpalatable & indigestible we can't really use it

It is all a matter of your property's balance

1. Flat irrigated property – straight forward
2. Small hill area & large paddocks – manageable
3. Summer dry hill country – less peak growth and better quality retention

For most NZ hill country with limited improved paddock areas balancing feed supply with stock demand is a huge challenge particularly in moist cold South Island hill environments

Unimproved hill country

The summer moist hill country challenge

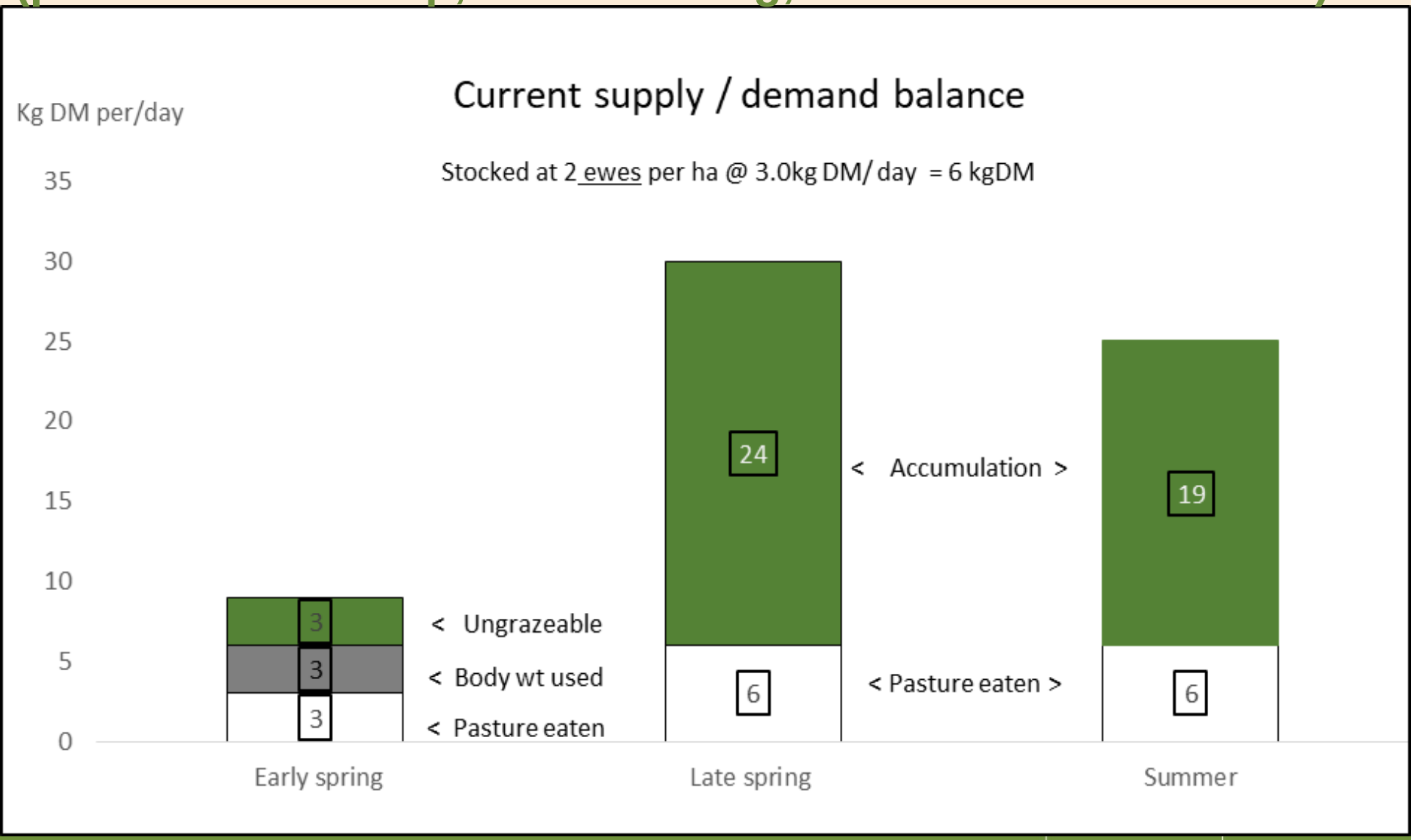
The role of Farmax

How well are we utilising Inverary's current resource?

Potential area	% area grazeable	% utilised	% of potential
100%	**62%**	**50%**	**31%**

Inverary unimproved hill country

(pastures browntop, Yorkshire fog, sweet vernal dominant)



Ewe flock response to hill growth curve

- **Early spring**
  - "Hungry skinny ewe" syndrome
  - Hidden feed problem
  - Weight loss impacts
- **Late spring and summer**
  - Reproductive growth > declining quality
  - Compromised lactation and growth
- **Autumn and winter**
  - Further rapid deterioration feed quality as energy requirement of pregnant livestock rises
  - Weight loss inevitable
  - Pasture cleanup – the impossible task

The immediate cost of poor spring feeding

Deaths 1% additional ewe losses at $150 per ewe = $1.50

5% additional lamb losses at $100 per lamb = $5.00

Growth 5 kg less weaning wt at $3.25 per .95 lambs = $15.50

Total "costs" per ewe set stocked = $22.00/ewe

Opportunity cost of remedial feed

- Ewe regaining 8 kg @150 gms / day requires 18.5 MJME/day over 54 days = 1000 ME

- 30 kg lamb gaining 150 gms per day requires 12 MJME / day = 80 MJME per kg gain

- **Substitution**

- If the ME used to regain 8.0 kg ewe weight was allocated to lamb finishing - 1000 MJME

- It would provide 12.5 kg lamb weight gain @ $3.20 per kg L W = $40.00 / ewe

Combined cost of sub optimal feeding in spring

- Immediate costs of spring grazing = $22.00
- Cost of remedial feeding = $40.00

Total cost of “poor” spring grazing $62.00

Pasture cage measurement programme

Not just quantity – what about quality

Inside the cage

Summer 9.3 ME

Autumn 10.8 ME 19 % dead grass

70% digestibility

Outside the cage

Summer 7.3 ME -

Autumn 5.8 ME 88% dead grass

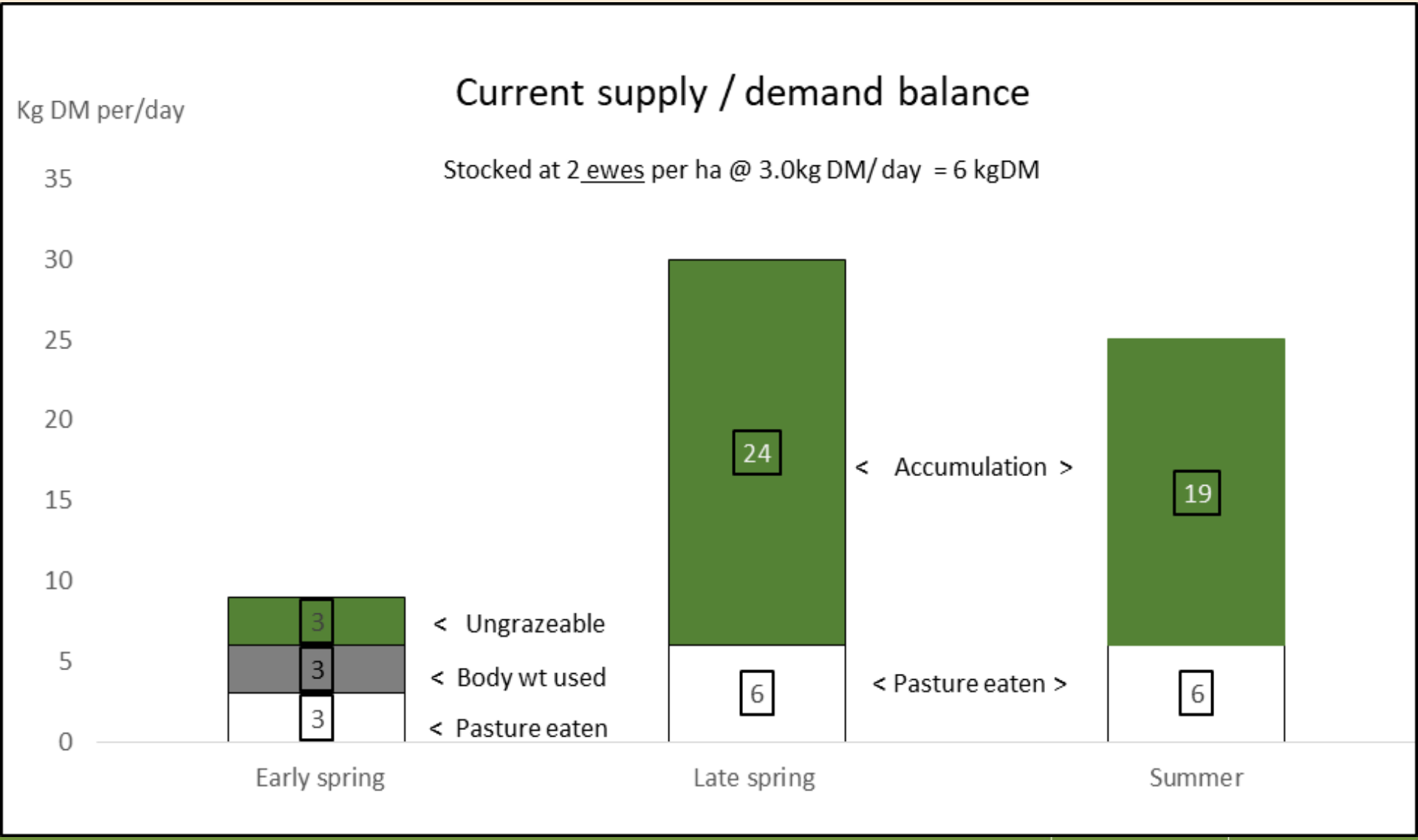
34% digestibility

Is this a problem or an opportunity?

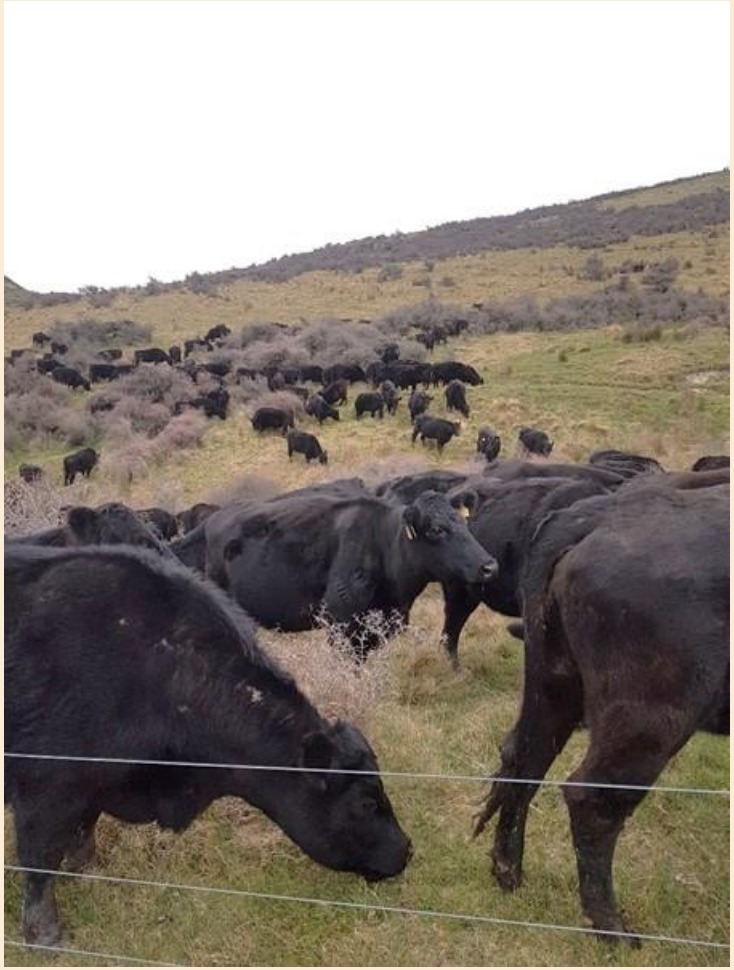
Mid winter – 5000 kg DM

The “hidden” spring growth

Inverary unimproved hill country



How do we deal with these summer supluses



Subdivision just concentrates the clean up to a smaller area while the remainder gets worse

Cows and ewes forced to clean up rank pastures lose unsustainable amounts of weight

At the rate we can clean up in the autumn with cows it would take us over a year

In the meantime the next wave would be following close behind

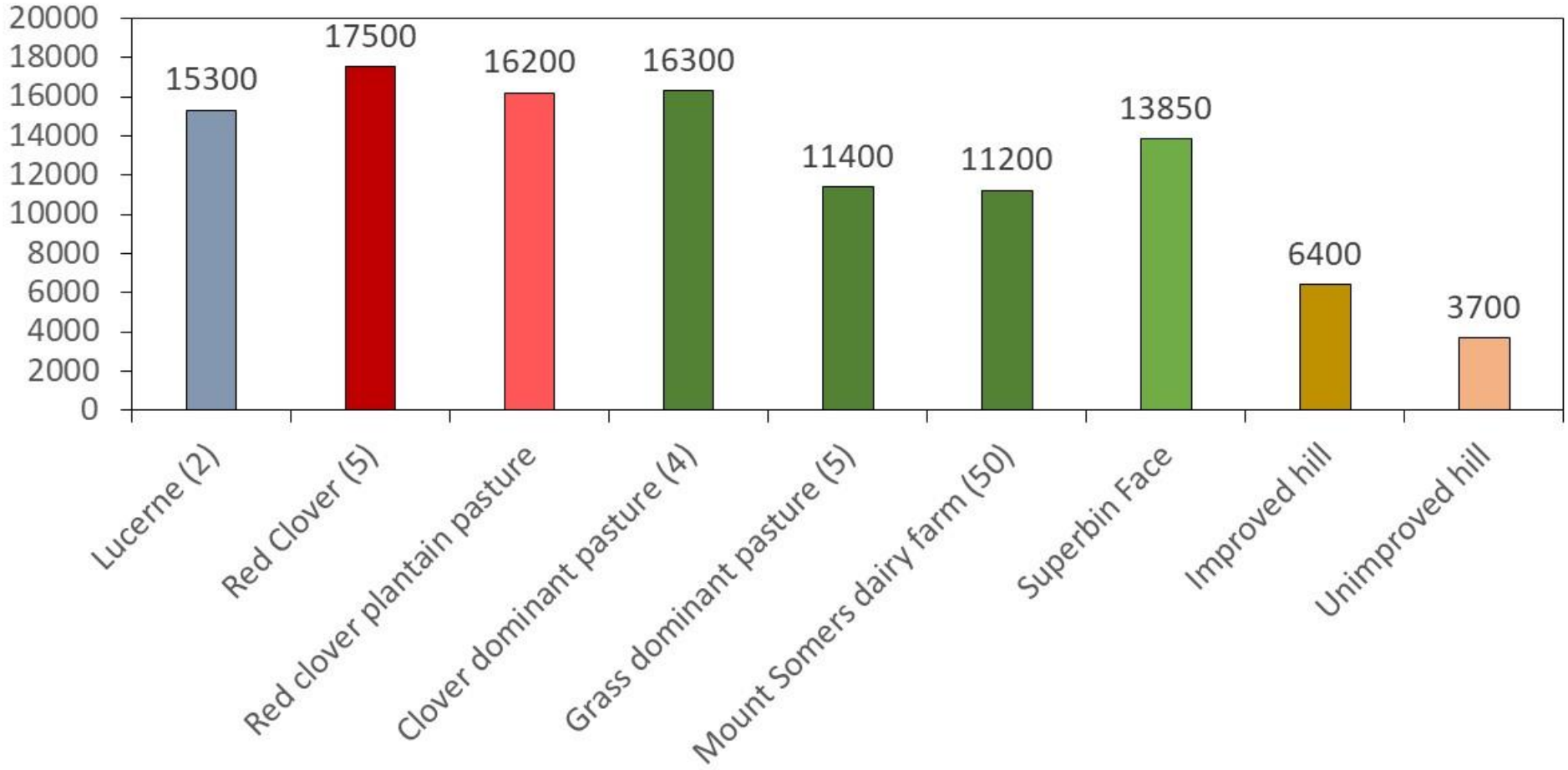
The only answer

- Stop the surpluses happening in the first place
- **Have enough quality feed available in the early spring that allows sufficient animals to be available later to utilise the surpluses as they begin**
- Utilise them when they are still nutritious
- Provide adequate subdivision

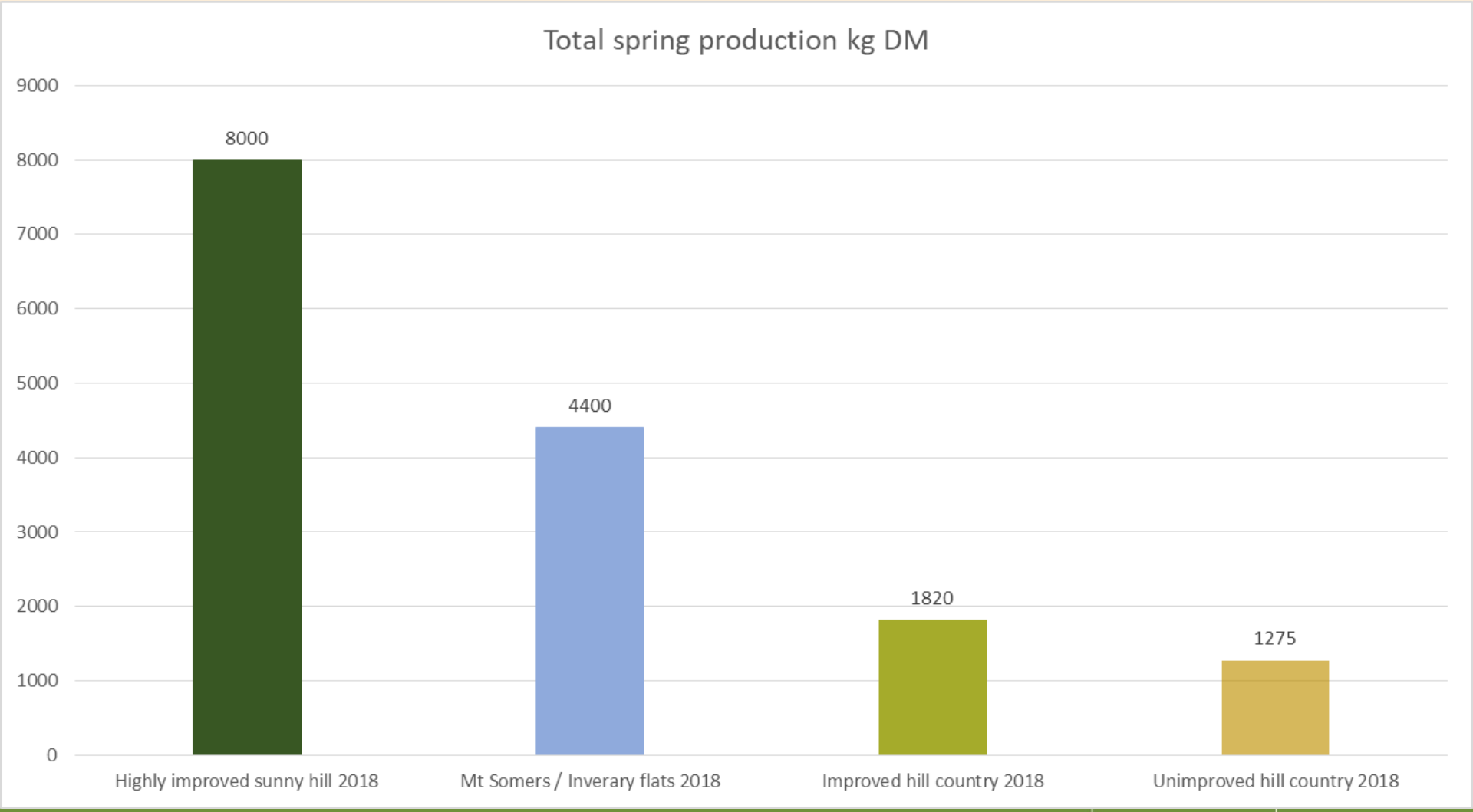
We need help - lets ask for volunteers

Don’t try and work with the incumbents – particularly browntop – here’s a hint!

Annual pasture production - kg DM



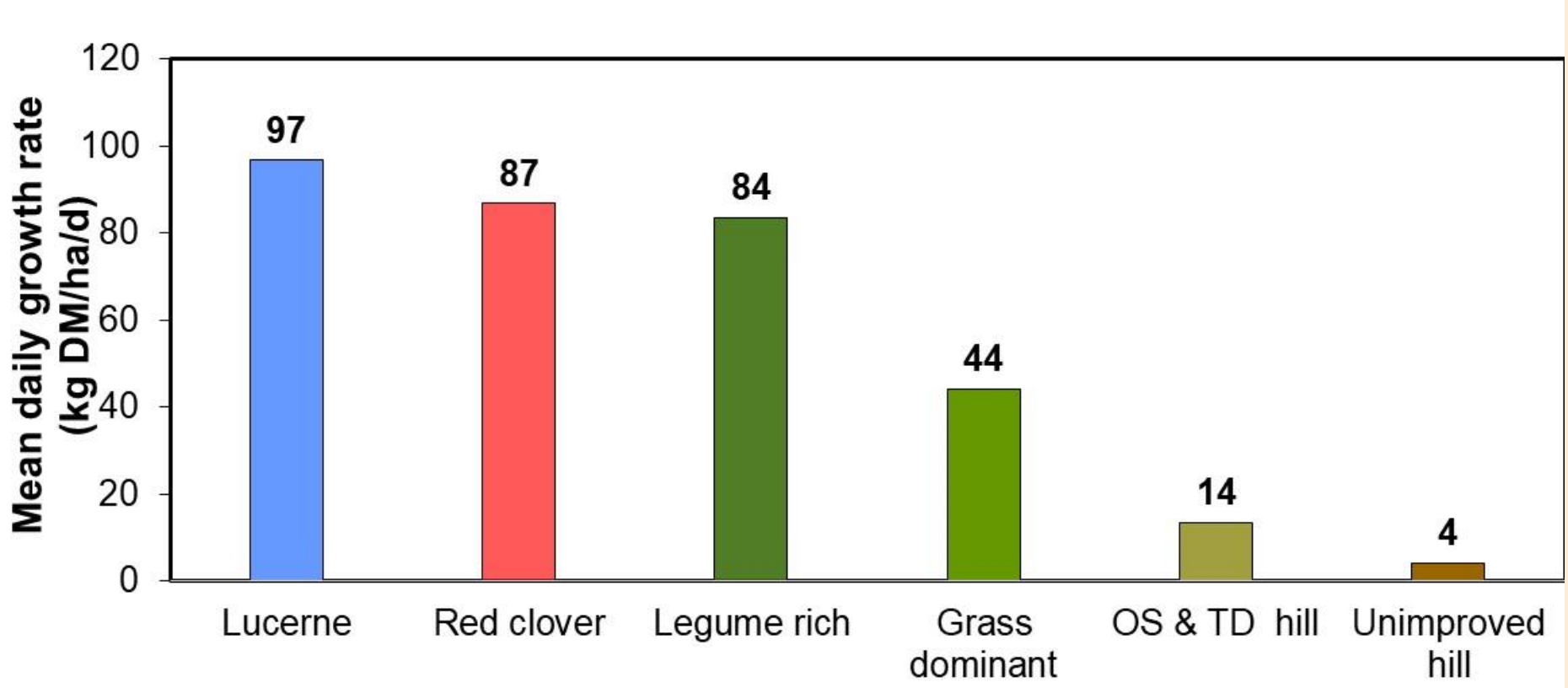
Total spring production August to end of November 2018



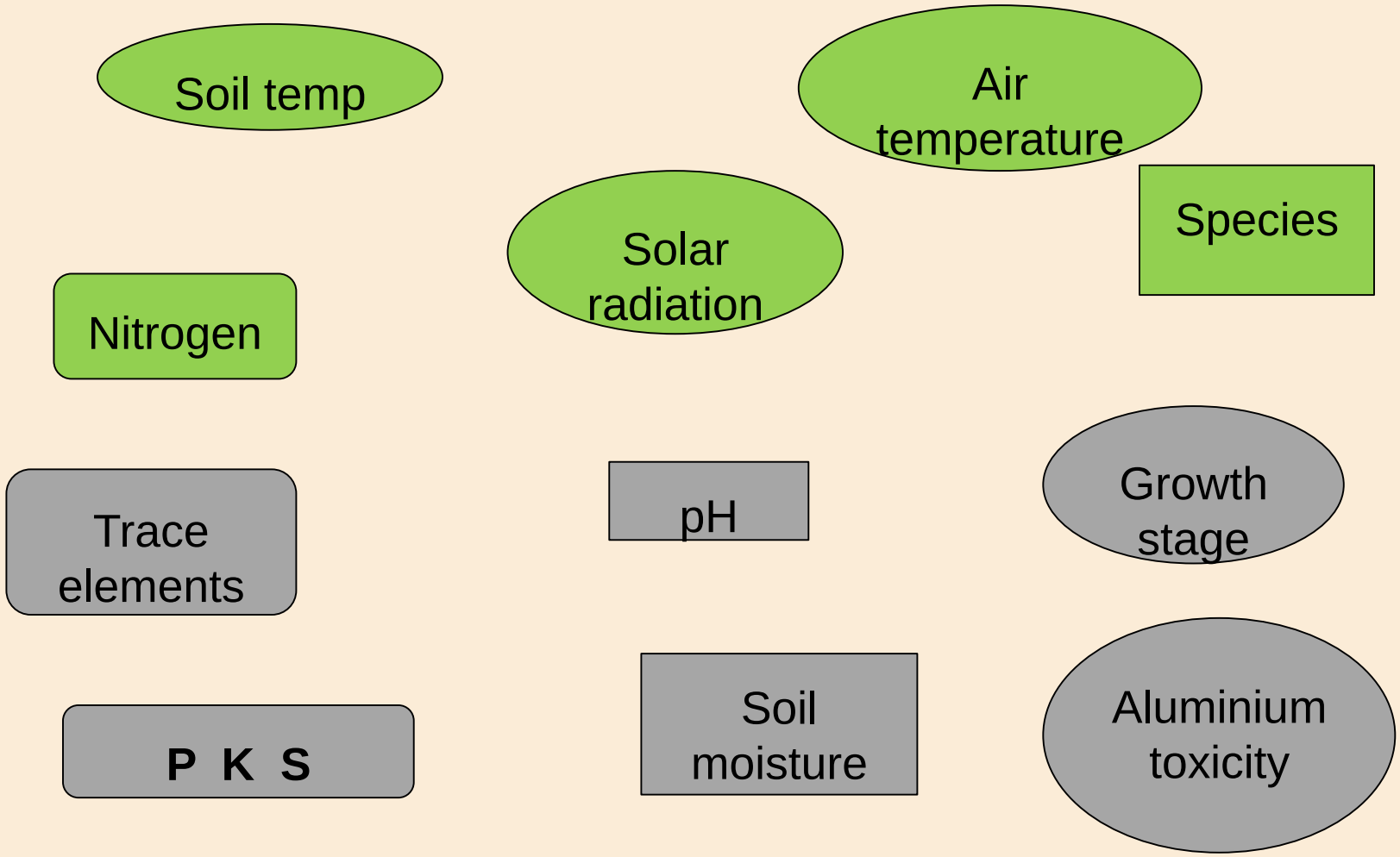
Early spring growth – through to 15th October

kg DM per day

Without exception legume pastures or legume dominant pastures have <u>double</u> the early spring production of grass based pasture

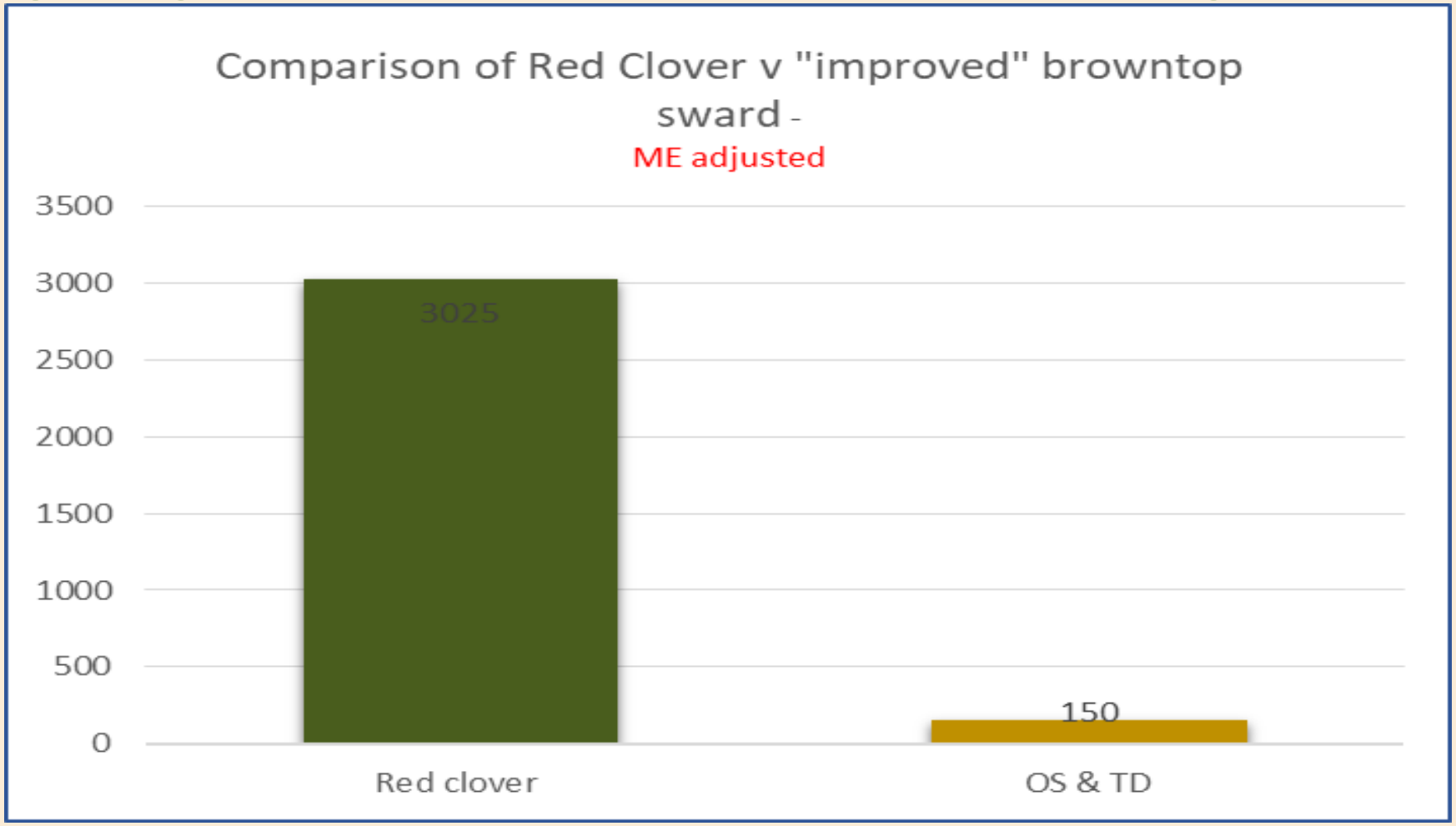


Pasture growth limitations

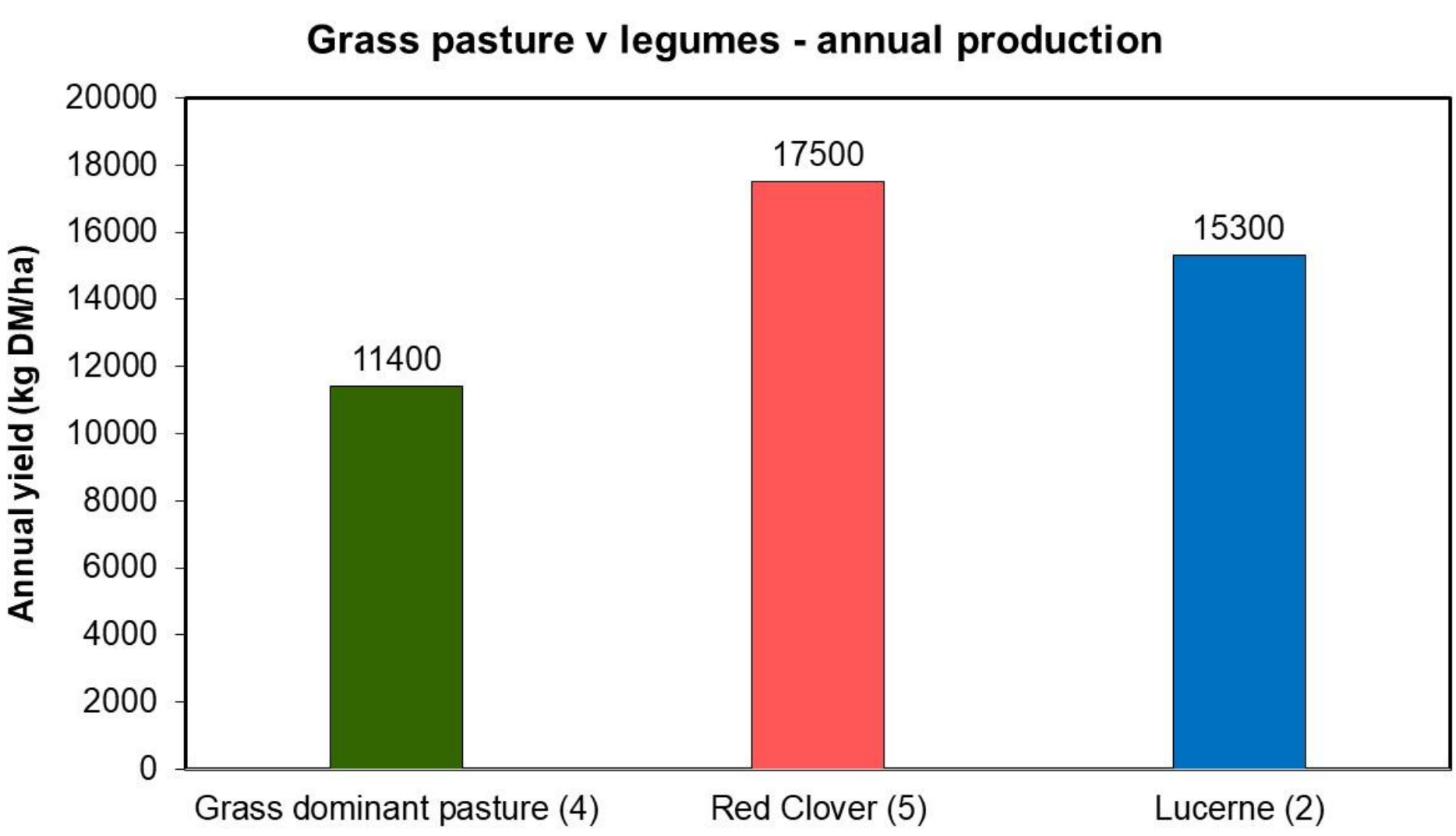


Superbin face

Superbin face –
high legume v browntop base (early spring)



The pasture on the left uses only about 2.5% more moisture for growth than it does for maintenance


Grass pasture v legumes - annual production
Annual yield (kg DM/ha)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
11400
17500
15300
Grass dominant pasture (4)
Red Clover (5)
Lucerne (2)

Brindles development 2014–2015

Incorporating Caucasian Clover trial area

What are the challenges?

- Establishment challenges
- Aluminium toxicity
- Weeds – esp thistles
- Grass re invasion esp Red fescue
- Longevity

Windblow - Including uncultivated ground

Thistles

Red Fescue – *Festuca rubra*

Ongoing grass re infestation

Aluminium toxicity

So what is currently happening at Inverary

- Satellite development
- Spray and delay technique
- New species – perennial and annual legumes
- Outside research
- Lime deep injection (lucerne)
- Developing a system
- Continuing cage monitoring
- The flow on benefits of legumes

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Where to from here?

Satellite development

20 ha for every 100 ha of hill country

- accompanied by subdivision / water supply etc

A variety of different legumes in different aspects

So what is currently happening at Inverary

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“Spray and delay”

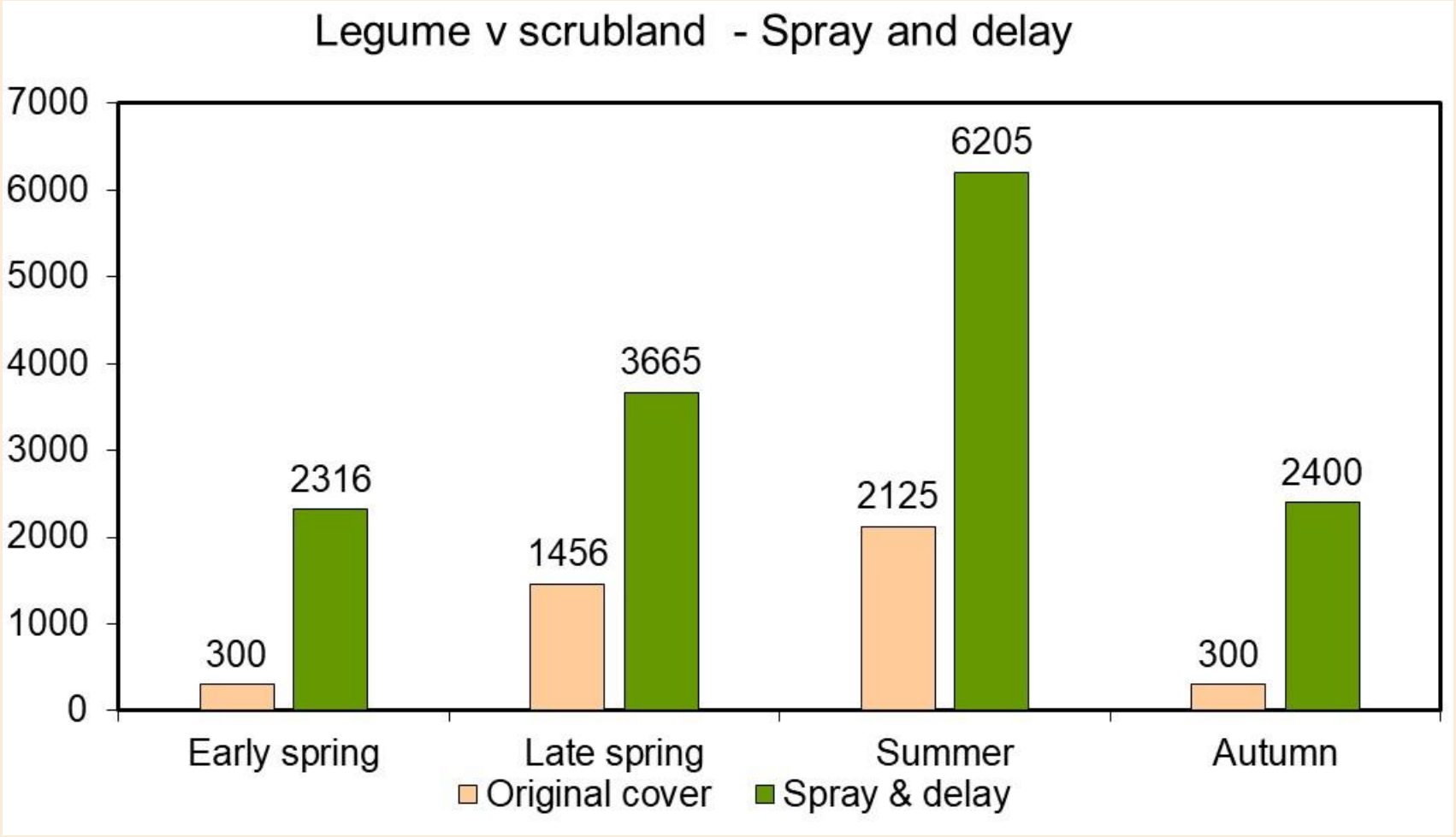
Matagouri Block – Spray and delay technique

Matagouri Block – Spray and delay technique

4000 kg DM

16600 kg DM

Matagouri paddock – Spray and delay

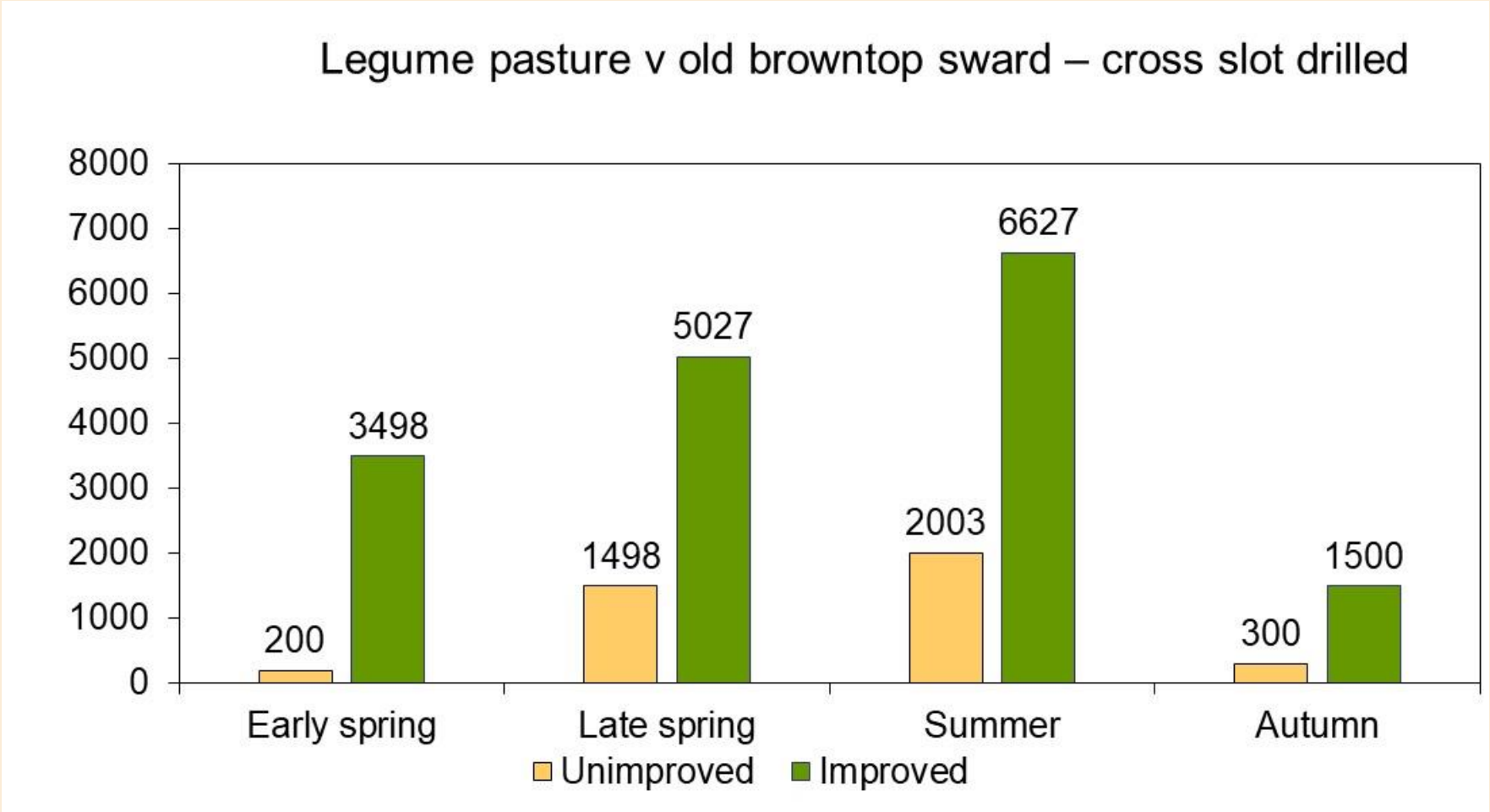


Because of the prior 85% scrub cover this represents a 25 times production increase

Lower Holding paddock – Cross Slot drill establishment

4000 kg DM → 16600 kg DM

Holding paddock - Contribution by seasonal growth



So what is currently happening at Inverary

- Satellite development
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- Developing a system
- Legumes – are they are a destination or a transition
- Outside research
- Lime deep injection (lucerne)
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Caucasian clover

- Longevity
- Production levels matching red clover
- Spreads by rhyzomes
- Extremely tolerant of close grazing
- Difficult to establish

Lupins

- Aluminium and low pH tolerant
- Lambing shelter
- High quality post lambing feed

Annual clovers

- Sub clover in permanent pastures

- Balansa , Arrowleaf, Persian - short term legume

So what is currently happening at Inverary

- Satellite development
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- New species – perennial and annual legumes
- Legumes – are they are a destination or a transition
- Associated research
  - » Environmental monitoring
  - » NZ multi farm legume in hill country study
  - » Lime deep injection (lucerne)
- Developing a system
- Continuing cage monitoring
- The “legacy” benefits of legumes

Associated research

Derrick Moot - Lincoln University
environmental monitoring of current legume strategy

Derrick Moot and Landcare Research

NZ wide legumes in hill country project

Derrick Moot – Lincoln University

Aluminium toxicity - deep lime injection

So what is currently happening at Inverary

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Legumes – A destination or a transition tool

- Three classes of country
  - Easily cultivated or drilled
  - Challenging sites – difficult to drill and spray
  - Aerial operation only

So what is currently happening at Inverary

- Satellite development
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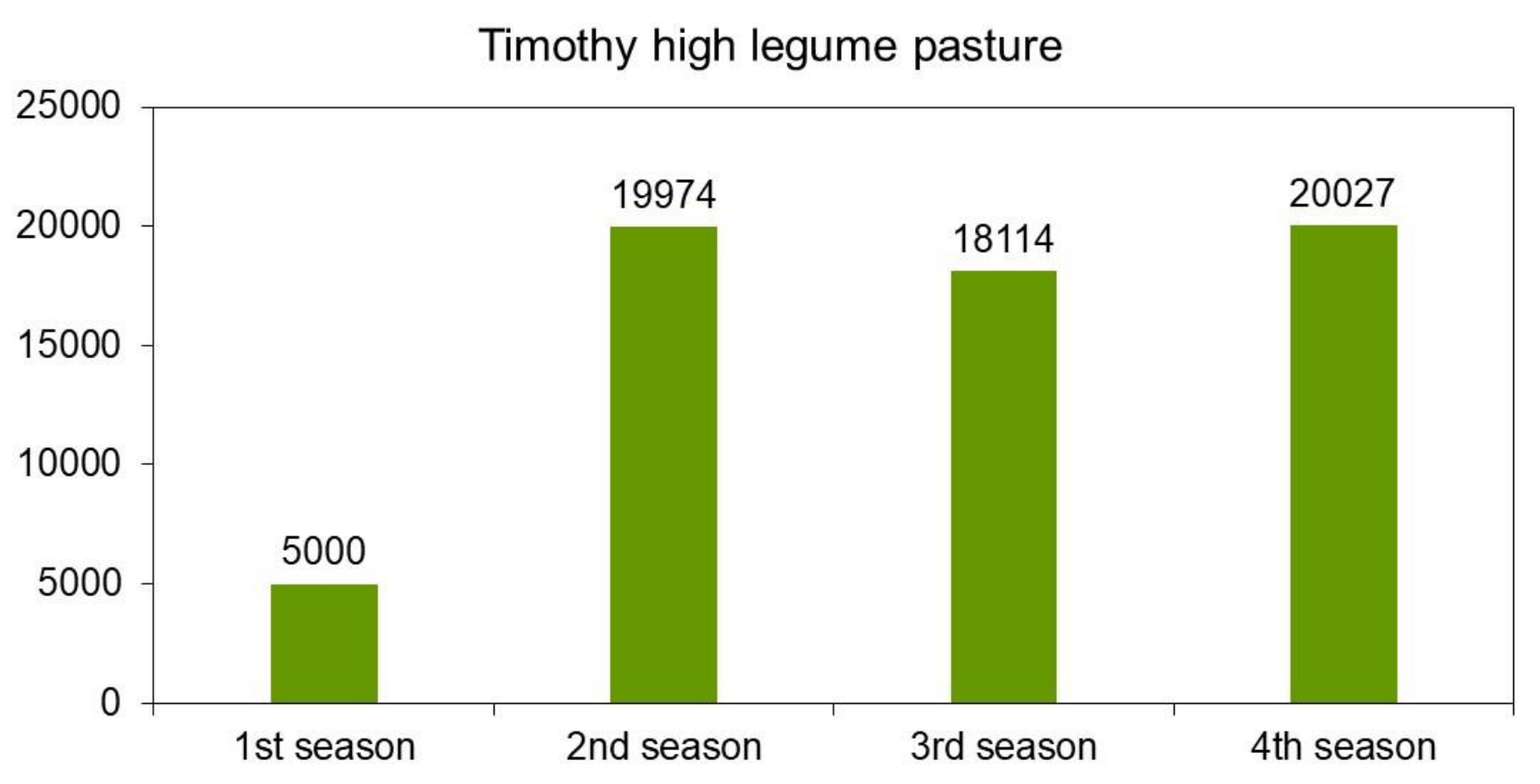
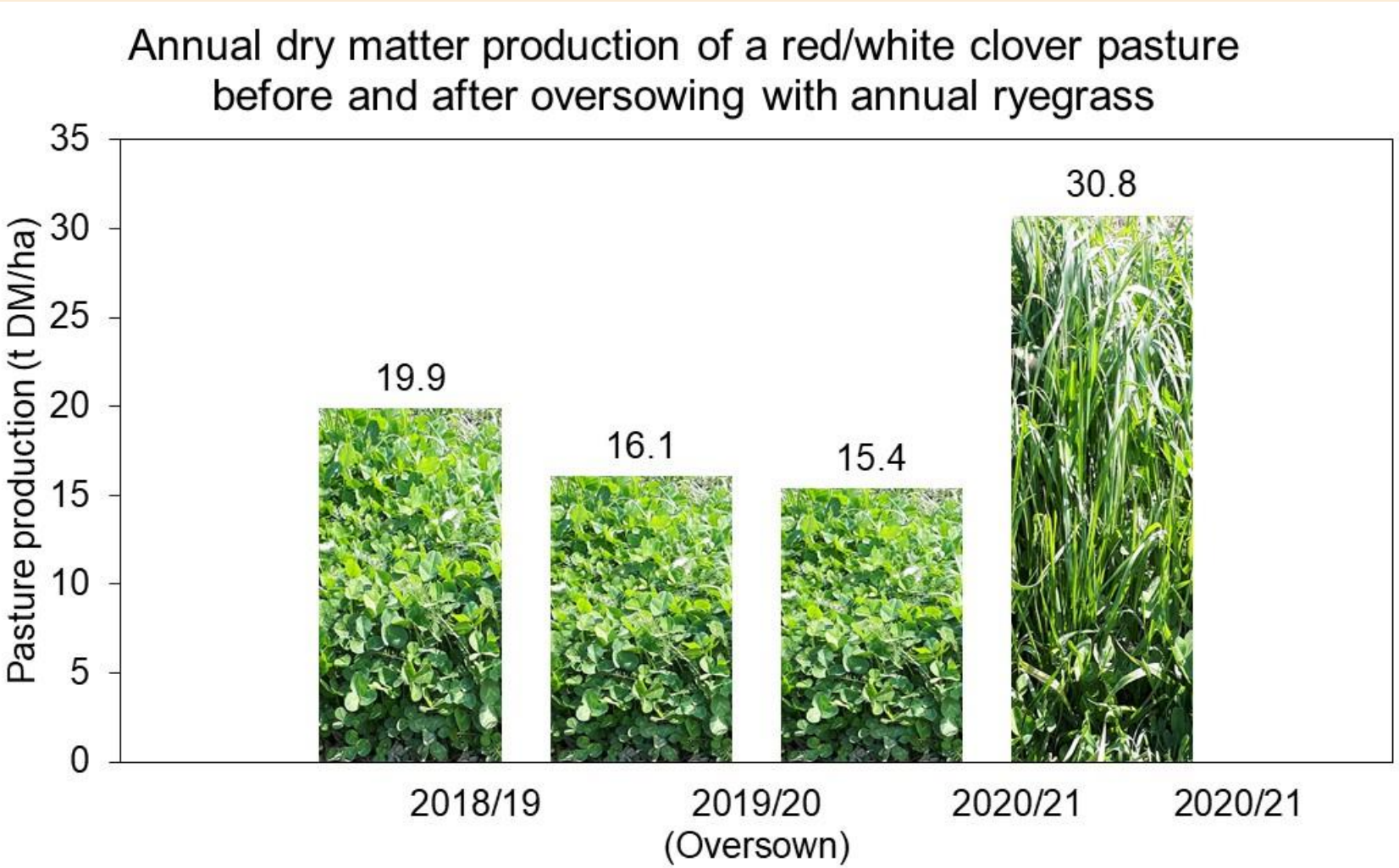
High producing permanent pasture

Choosing your grass component



The “legacy” effects of legume pastures


Annual dry matter production of a red/white clover pasture before and after oversowing with annual ryegrass
Pasture production (t DM/ha)
35
30
25
20
15
10
5
0
19.9
16.1
15.4
30.8
2018/19
2019/20
(Oversown)
2020/21
2020/21

What are the lessons

- Legumes are going to have a place in your farming system – be clear what that needs to be
- Work with your natural advantages – Is it necessary to install a centre pivot , grow summer crops and still finishing lambs in may
- Maximise the early spring opportunity that legumes provide – not try and fill in the summer eg early weaning, early lambing.
- Hill country poses a lot of challenges but don’t underestimate the opportunities with different plants for different places
- Always question conventional wisdom and accepted practice
- Begin to understand the place of legumes in climate change

Is what we are doing sustainable?

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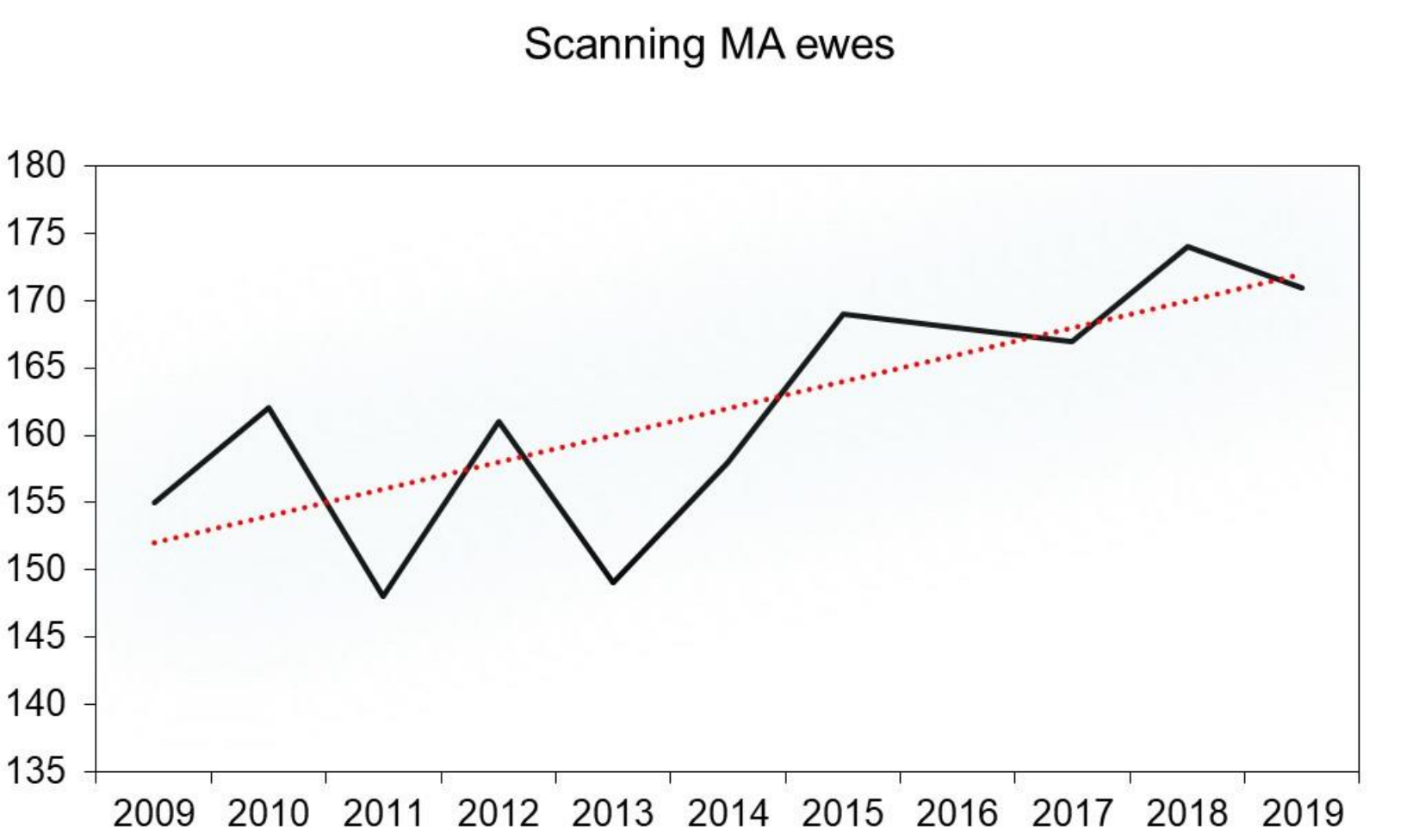
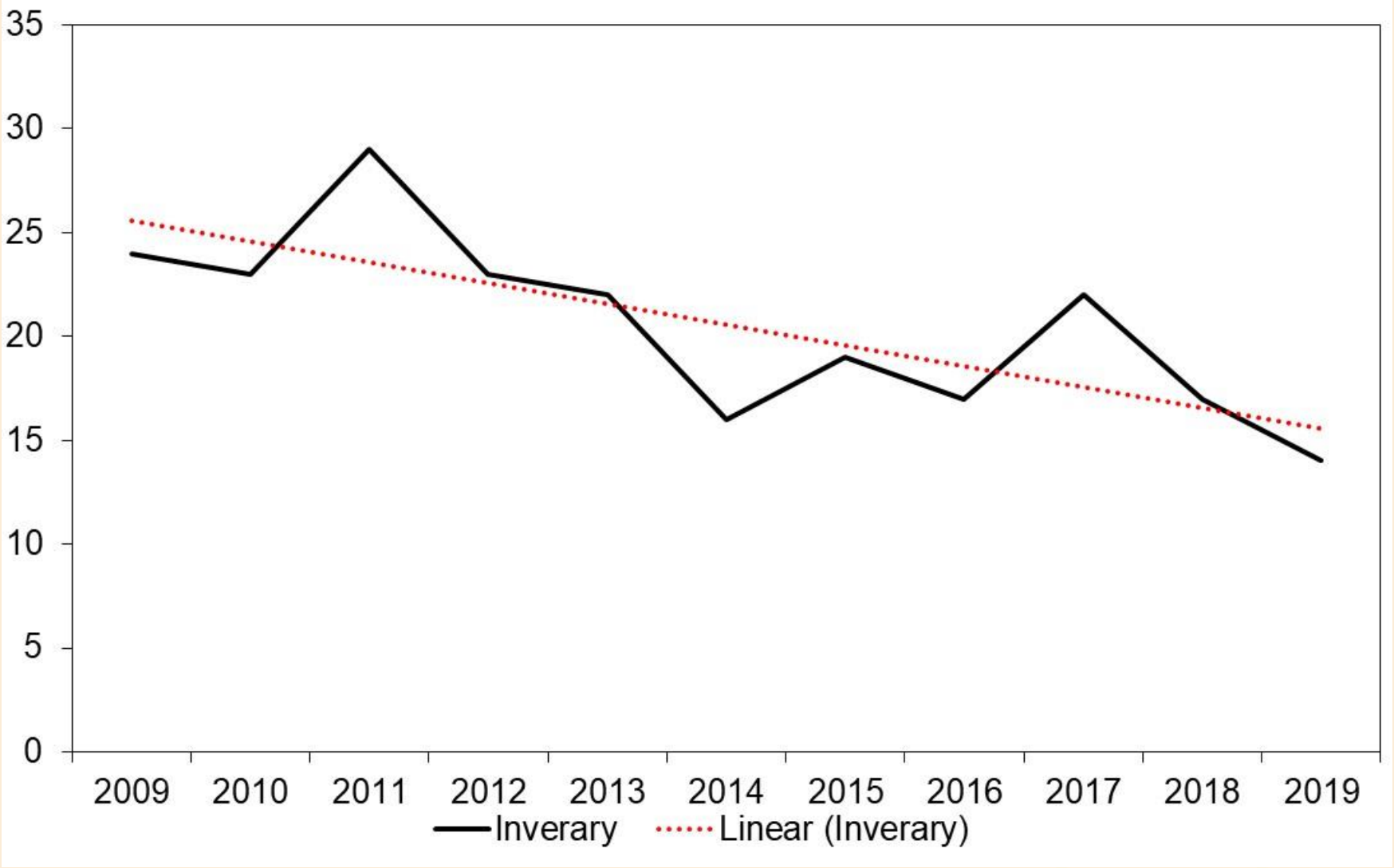


Lamb wastage



Is it sustainable for us

Income

Farm succession

For the local environment

Biodiversity

Profitable farming provides opportunities for conservation

Weed control is a function of profitable farms

For the local community

Mt Somers ROGAINE

Held on Inverary Station

Sunday 4 February 2018

Carbon and methane

All the other questions of

* soil carbon sequestration,
* better soil health,
* more biodiversity,
* reduced water pollution and
* more resilience to drought, floods, and pest incursions:

The final judges of your soil biology!