Boosting winter pasture growth

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Presented by Lisa Miller, Southern Farming Systems

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Main topic areas

Drivers of growth & what we can manipulate.

Gibberellic acid versus Nitrogen

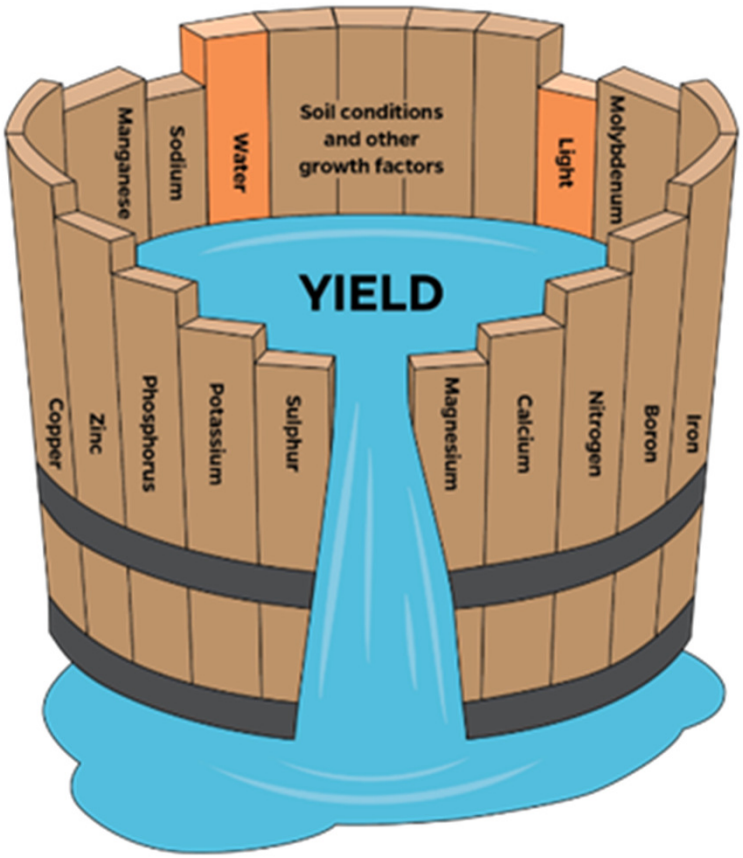
How to respond when the pasture is compromised

Identifying the lowest hole in the barrel

Liebig's law of the minimum

Plug the lowest hole to increase yield to reach the next production level.

Poor responses to N or Gibberellic acid if other nutrients or soil conditions are limiting. Eg Moisture!



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Some drivers of plant growth

1. Moisture – 50mm of stored moisture
2. Leaf area - influences how much light plants absorb.
3. Temperature - influences leaf appearance rate.
4. Nutrients - makes plant leaves longer & wider

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Leaf area – solar panels

More solar panels, more growth

Ideal pasture height – above 2 to 3cm (800kg DM/ha)

<u>Strategies to influence</u>

Rotational grazing

Confinement feeding or sacrifice paddocks.

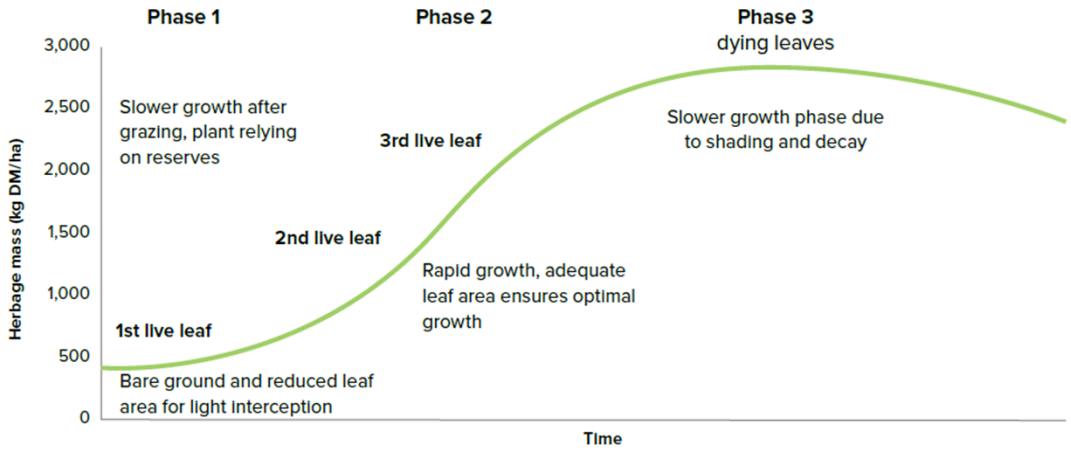

Figure 10. Phases of pasture growth over time as indicated by herbage mass accumulation (kg DM/ha). (Adapted from Prograze®[6])

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Temperature effects on leaf appearance rates

Number of days to grow 1 new leaf

7-10 days in late spring

18 to 21 days in winter

Growth

Ceases below 4 degrees

Carbohydrates are restored in tiller base when full complement of active leaves are grown.

Phalaris – has 4 actively growing leaves, Ryegrass 3.

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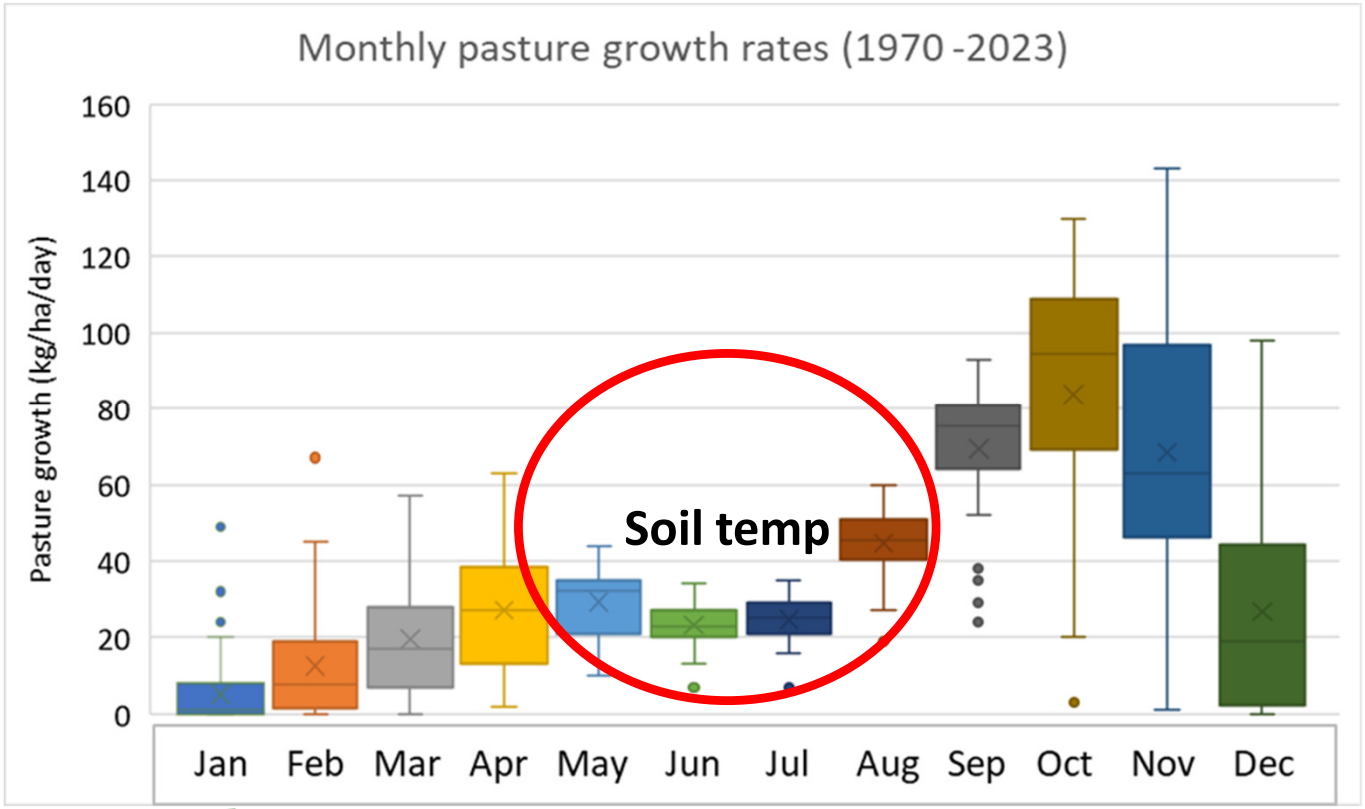
Temperature – a low hole in barrel in winter

Modelled **growth rates** near Geelong by Cam Nicholson



Variation in growth between months & in months. When feed budgeting always be wary of using "average" growth rates.

In dry areas, "Is it worth sowing species for quick feed?"

Temps will limit growth, may not be able to graze them until September.

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Cold temperatures-> Consider Gibberellic acid

- Gibberellin hormone occurs naturally in roots.
- Production is restricted in cold temperatures.
- Stimulates shoot and cell elongation, causes a yellowing (chlorophyll dilution) but pasture is okay.
- The maximum response from the application will occur after 3-4 weeks but may continue to have an effect for another 4 weeks.
- There must be green leaf present for uptake.
- Reduction in spring production.
- Phalaris very responsive, can use 10g/ha but perennial ryegrass need 20 g/ha.
- Does not work on tall fescue or annual ryegrass.

Meredith 2017, lighter green strip where Gibberellic acid has been applied.

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Responses to Gibberellic acid

Examples of responses:

- Quoted responses, Phalaris more responsive 400 kg DM/ha versus perennial ryegrass 300 kg DM/ha over 21 days.
- Meredith, GA applied mid Aug, extra 667 kg DM/ha in phalaris/clover pasture after 36 days.
- PPS trials, near Ararat, avg extra 133 kg DM/ha, over 15 sites across 3 years after 21 days.
- CSIRO, Canberra 460 kg DM/ha after 21 days.
- MLA Rokewood demo site grew an extra 106 kg DM active phalaris pasture (N deficient) after 70 days.

Cuyac, 8 days following treatment, PPS MLA PDS report

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Nitrogen Cycle

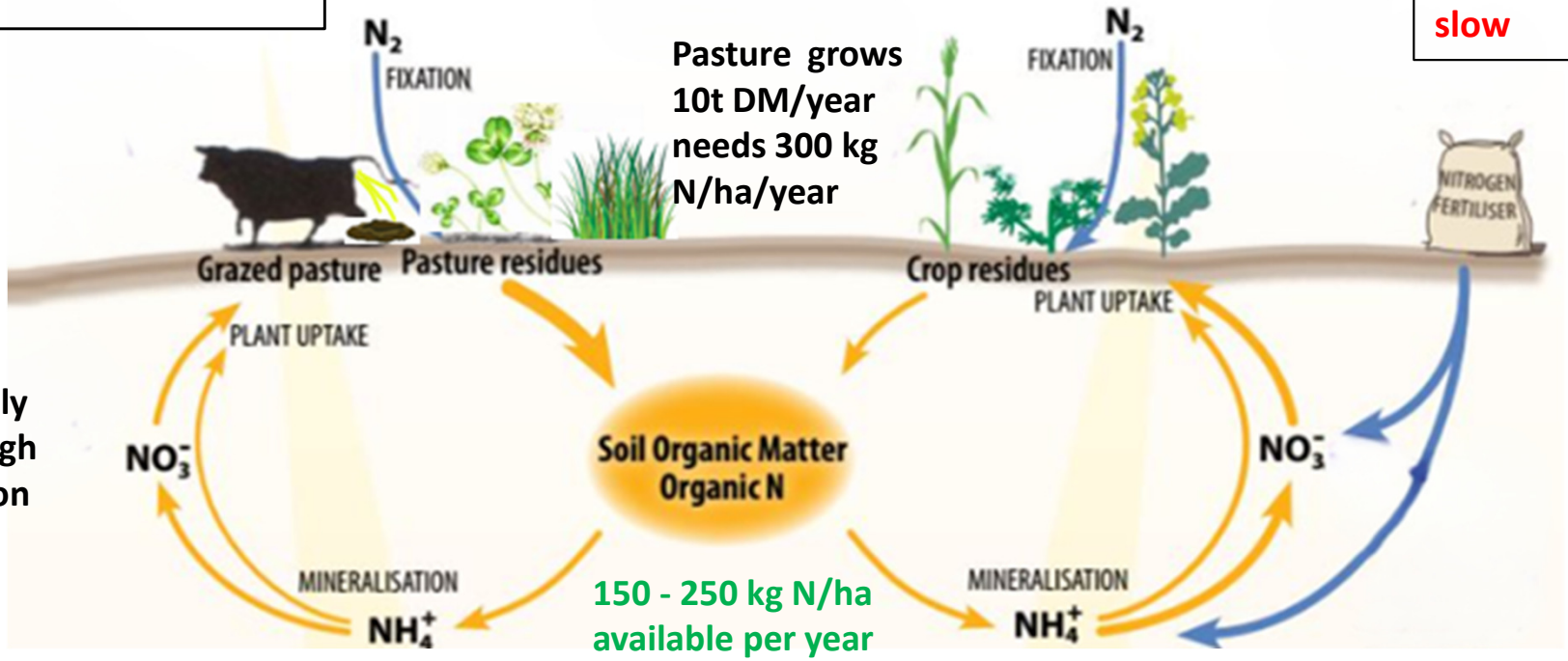
Cow urine patch 250 kg N
75%-95% of grass eaten -> urine or dung

Clover fixed N: 25kg N/ha/year for 1 t of clover DM produced

Pasture residues 2.5% to 3.5% N

Potential deficits - Pasture demand is high and release from organic N pool is slow

Pasture grows 10t DM/year needs 300 kg N/ha/year



Largest supply of N is through mineralisation

150 - 250 kg N/ha available per year

Fastest in moist soils, with increased temperatures, good pH & well oxygenated

Adapted: Peverill et al, 1995

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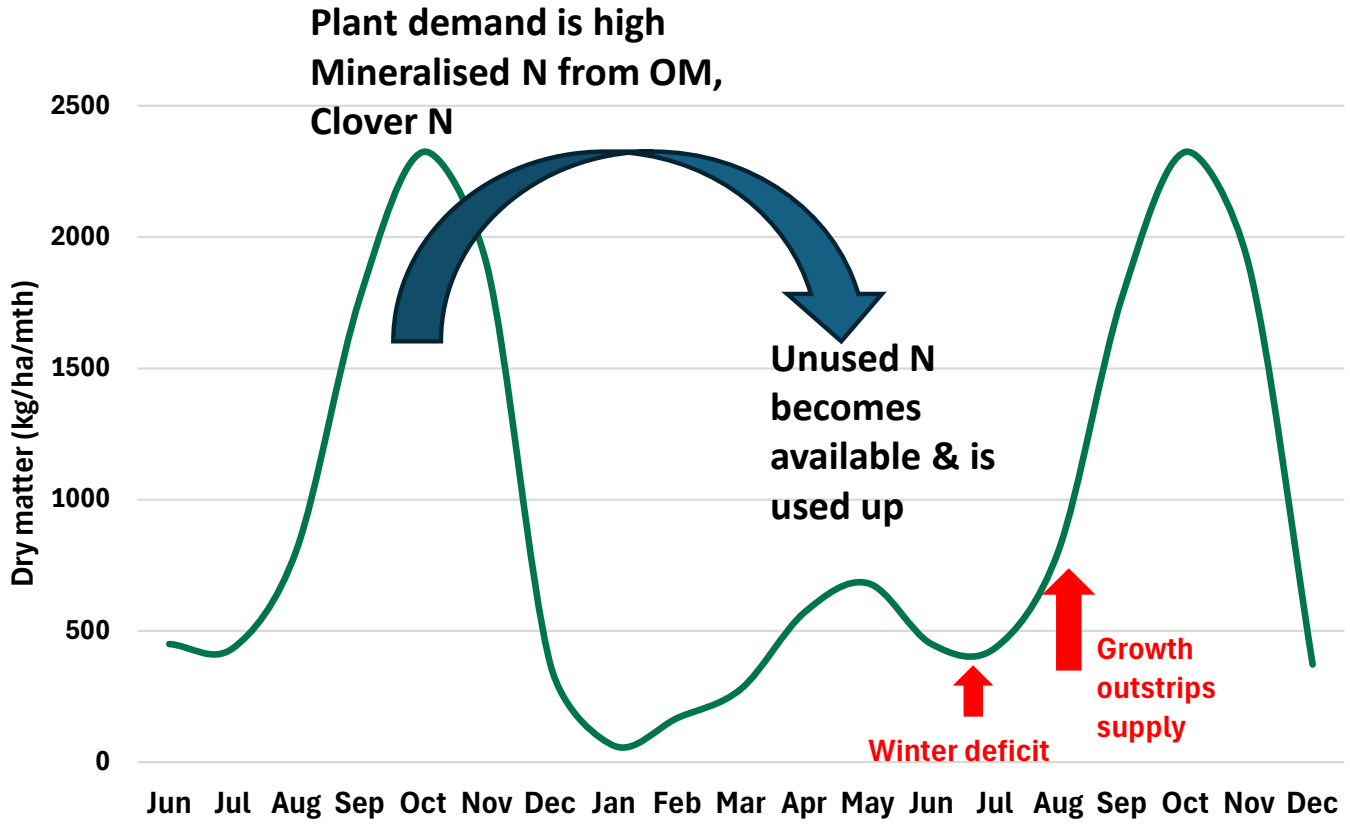
Pasture responsive to Nitrogen
1. Dry summer -> winter N deficit



Good times to apply N fert

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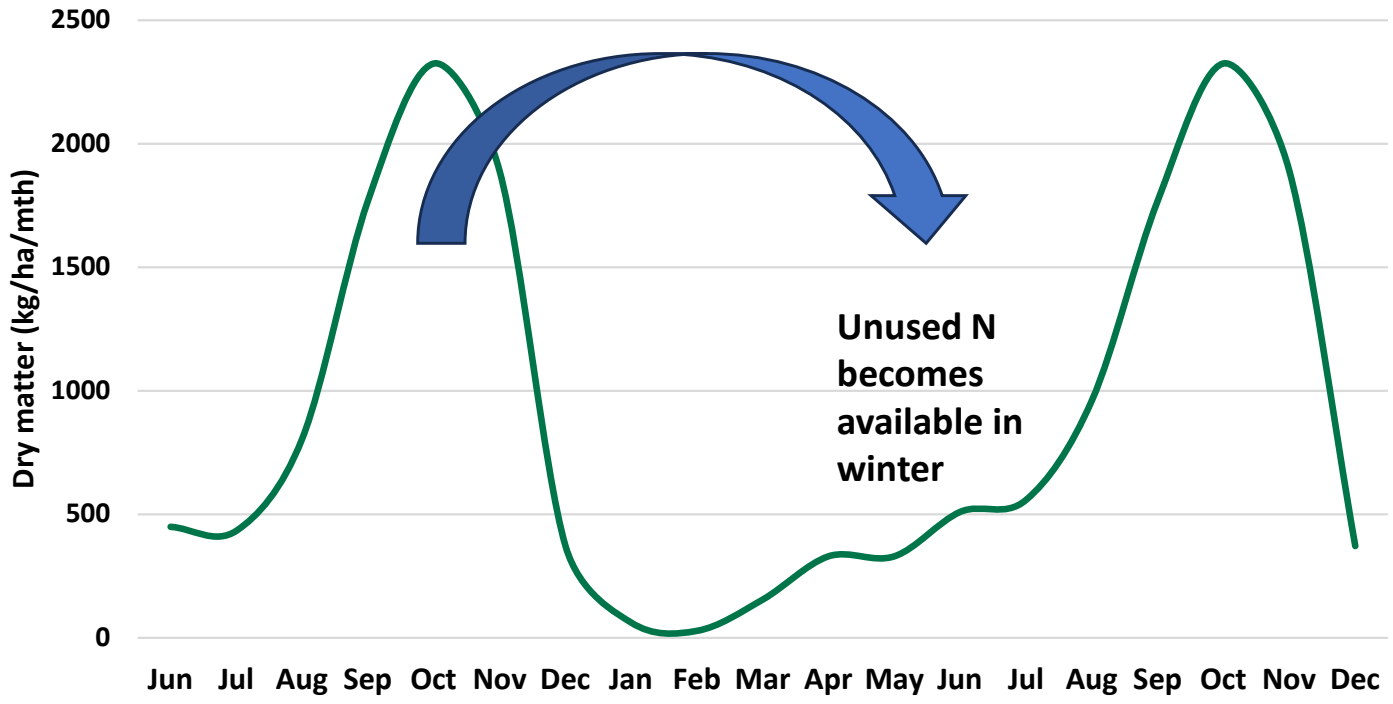
2. Dry summer & dry autumn -> no winter deficit



N may not be limiting. We see good growth rates.

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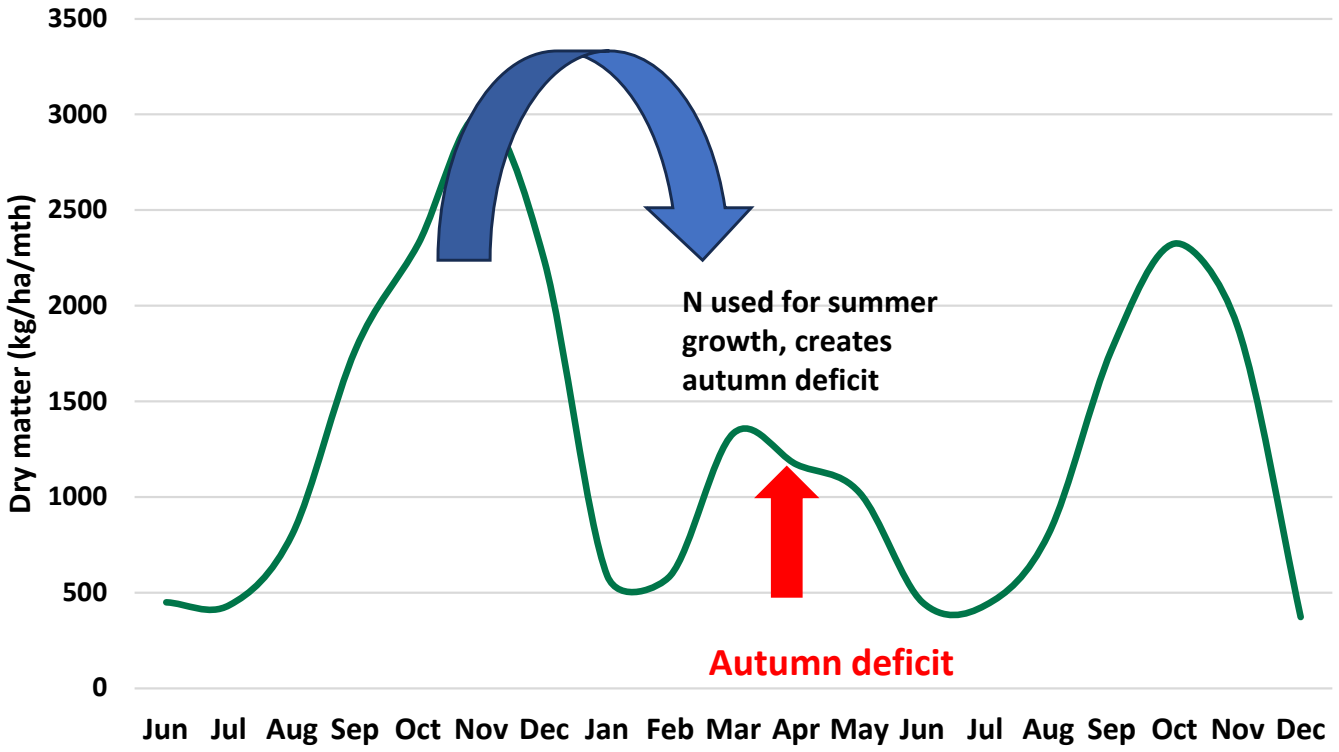
3. Wet summer -> autumn deficit



Good time to apply N fert

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Using soil tests/observations to check potential N responsiveness

Soil tests as a guide

* Nitrate – readily available for uptake
* Ammonium – what is likely to become available.
* A combination of greater than 20mg/kg is desirable.
* Andrew Speirs, Meridian Ag reported available nitrate & ammonium levels in SW Vic. ranged from 35 to 200 kg/ha, hence not N responsive.

Tissue test: Optimum N is 3.2-5.5%

Observations:

- Check urine & dung patches for instant feedback (rule out potash in urine or P in dung).
- Hidden hunger: reduced growth
- Yellowing is more apparent in crops when deficient.
- Clover content in previous spring

Photo taken, early October urine patches, 250 kg N

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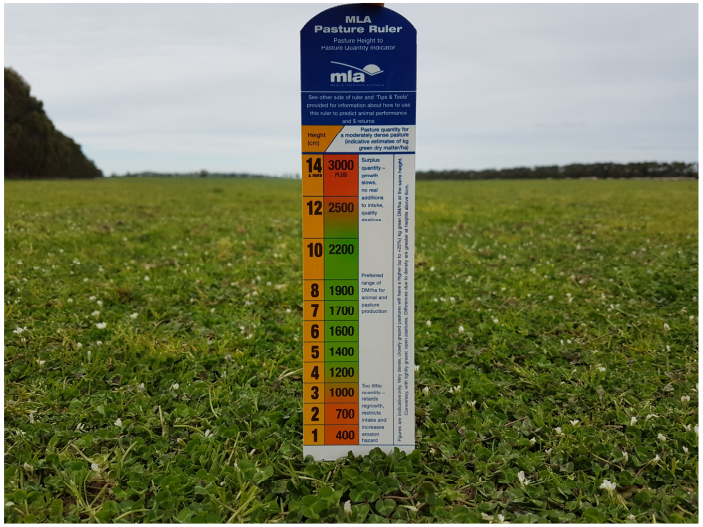
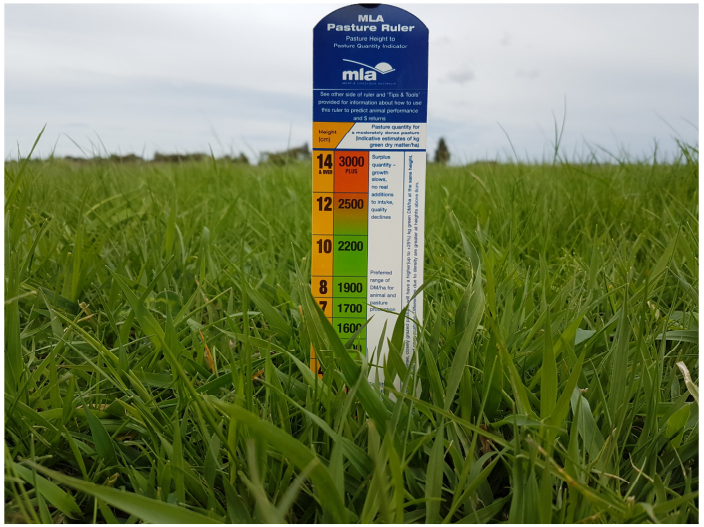
Nitrogen loss through fertiliser application to dry soils

Volatilisation of Urea -> Ammonia gas

Dry soils – Drift
Up to 20-30% loss
<5-10mm events
Drying soils
Open canopies
Wind
^ temperatures
^ soil pH
^ organic matter





- Aim to get N product absorbed into ground as quickly as possible.
- Want 5 to 10 mm of rainfall to move N fert into the soil within 36 to 48 hours.
- If **urea** is applied to wet soil without rainfall to wash it in it can still convert to ammonia gas.

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Nitrogen responses

Additional growth for each 1 kg of N applied

Season	Kg DM	Typical response times
Winter	5-10	35 - 90 days
Spring	15-20	14 - 28 days

- Eg Apply 50 kg N/ha = 250kg DM/ha - 500kg DM/ha.
- Higher response rates on annual ryegrass > perennial ryegrass > phalaris,
- Higher response rates on grass dominant pastures and soils with optimal fertility.
- At Rokewood demonstration site on 2nd year pasture (30% phalaris), 161 kgDM/ha response

Photo taken by Lisa Warn

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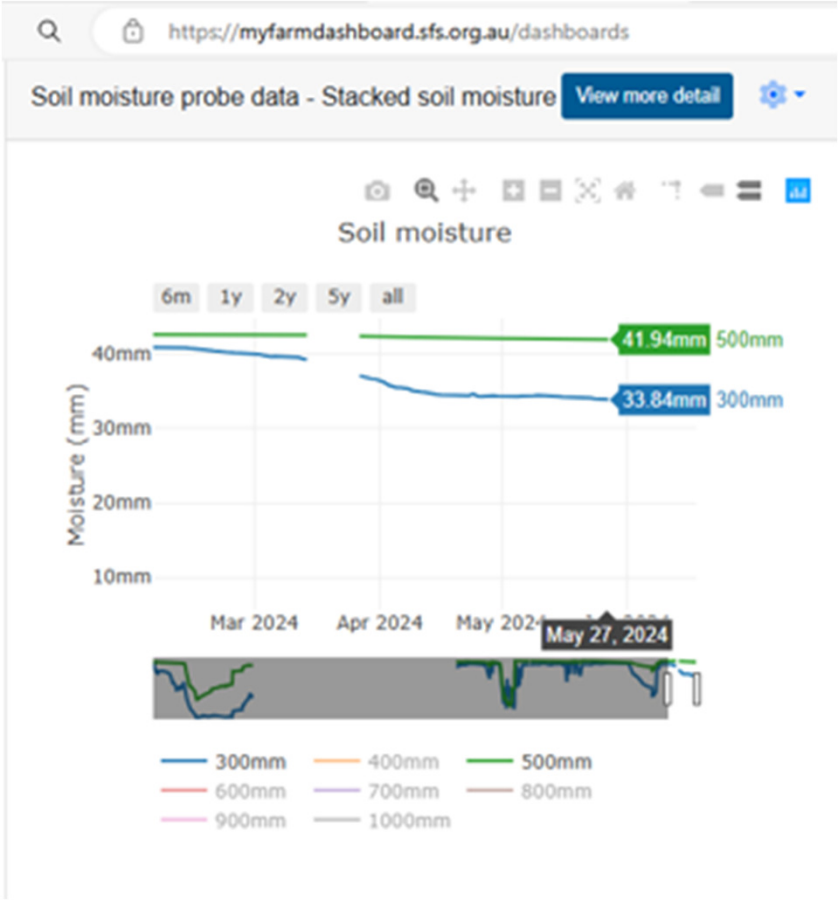
Other N fertiliser considerations

- Need 50 mm stored moisture to drive DM response
- Rates, use 25 to 60 kg N/ha.
- Apply soon after grazing as active growth occurs in the two weeks post grazing & needs N.
- Don’t graze before the third leaf on the tiller has grown, takes 5 to 6 weeks for growth to occur.
- Poor response if low soil fertility, (P, K, S, soil acidity, Molybdenum on light textured soils).
- To avoid potential nitrate poisoning, don’t graze before 21 days.



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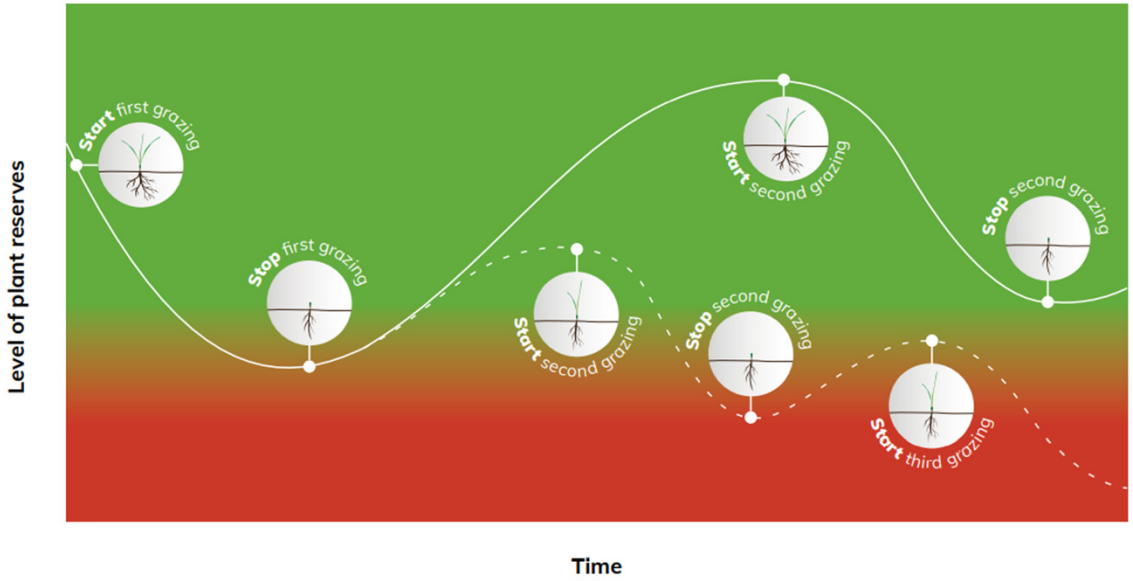
Costs (figures from Andrew Speirs, Meridian Ag)

Costs of responses	Urea	Gibberellic Acid
Dry matter response	Assuming 175kg/ha DM	Ryegrass Assuming 300kg/ha DM
Rate	75 kg/ha of Urea (35 kg/ha N)	20g/ha
Product & application costs	$750/t delivered & spread (31.5.2024)	$13.60/ha for product & $18.00/ha spray application (Pro Gibb 250 gram container @ $170 for 400g/kg active product = $0.68 per gram
Total Cost applied ($/ha)	**$57.07**	**$31.60**
Dry Matter cost (cents per kg) at 100% utilisation	**32.6 cents**	**10.55 cents**
Equivalent cost per tonne of DM at 100% utilisation	$326/t	$105.50/t
Dry Matter cost (cents per kg) at 80% utilisation	40.7 cents per kg DM	13.2 cents per kg
Equivalent cost per tonne of DM at 80% utilisation	$407/t	$132/t

When the pasture is compromised

What is important is:

- We recognise the situation is less than desirable.
- We know what impact this will have on our pasture.
- We know how to respond.
- We respond when possible.



Repeated grazing (second bite) depletes plant reserves & over time threatens persistence

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Impacts and potential responses for little pasture growth

Impacts

- Increased germination of sub-clover.
- Leaf emergence slow.
- Insufficient leaf area.
- Grazing before 3 leaf stage, so the plants fuel tank (reserves) are low.
- Likely to graze plants before they have fully recovered.
- More opportunity for weeds to invade.

Responses (how/when)

- Containment feeding/Sacrifice paddock
- Prioritise paddocks – actively manage those with greater leaf area & may need to sacrifice others.
- Spell during spring, to get to 3 leaf stage
- Optimise tiller set in spring (Light, N, Full fuel tank).
- Encourage sub-clover seed set.
- Possible late spraytopping.
- Reduce cutting of hay but silage ok.
- Consider poorer paddocks for renovation

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SFS/MLA Workshops coming soon

The type of workshops to be offered:

1. More Sub - Creating and keeping a strong clover base
2. Recover rundown pastures: Expert Strategies for Thriving pastures.
3. Meeting Grazing Challenges: Changing seasons changing management.
4. Less Weeds: More Feed - Mastering manipulation strategies to minimise weeds
5. Sowing Success: Mastering Pasture Establishment Techniques

Get in touch for an EOI form or watch out for advertising

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Resources

https://sfs.org.au/project/dry-times-strategies-for-managing-a-late-break-and-lambing

mla-how-do-i-respond-to-challenges-in-grazing-mixed-pasture.pdf

My Farm Dashboard (sfs.org.au)

https://sfs.org.au/resource/how-to-use-fertiliser-n-successfully-lee-menhennett-incitec-pivot-fertilisers.

Access calculator for comparing costs of N fertiliser to purchased feed.

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Take home messages

Moisture could be the lowest hole in the bucket – this limits urea and Gibberellic acid use.

Use confinement feeding to increase leaf area on pastures to drive growth.

Nitrogen is a critical driver for growth, but it may not be limiting.

Gibberellic acid could be the preferred option because it provides quicker and cheaper dry matter and pastures are likely to be responsive.

Look to help pastures recover from overgrazing in spring.