"Topical Topics":

- **Pasture Quality**
- **Milk Urea**

Southern Dairy Hub Wednesday 2nd October 2025

Dr Charlotte Westwood, Veterinary Nutritionist, PGG Wrightson Seeds

1. Pasture Quality

- Main feedbase for almost everyone
- Leo will cover how pasture grows, *next* session
- How to define pasture quality?
- Not only MJME but good start
- Other measures too

MJME

- DOMD x 0.16 – simply a calculated value
- MJME the proportion of gross energy in feed available to cow after allowing for energy lost in dung, urine and as methane
- High is good, low not good. Less than 7.5 MJME/kgDM won't even maintain a cow or heifer

Crude Protein (CP)

- Dietary crude protein = the nitrogen content in feed x 6.25
- "Crude" protein gives an approximate indication of protein. CP tells us nothing about amino acids, and how rumen degradable the protein is (rate, extent of protein breakdown in rumen)
- CP is potentially (but not always) associated with milk urea (MU)

Neutral Detergent Fibre (NDF)

- Fibre. Includes cellulose, hemicellulose & lignin.
- Linked with how much a cow can eat. Maximum intake of NDF per cow per day on pasture works out around 1.5% of her bodyweight

Acid Detergent Fibre (ADF)

- Another measure of fibre, includes just cellulose, lignin
- Linked with energy density of pasture

Lignin

- A really indigestible part of cell wall, links to cellulose, hemicellulose making harder it for rumen bugs to digest dietary fibre. Higher lignin makes pasture harder for cows to harvest, rip away from plant

Water soluble carbohydrates (WSC)

- Energy source for rumen bugs to help digest fibre. Tasty – cows like WSC. Typically lower during warmer months of year

Hill Labs

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Certificate of Analysis

Client:
Address:

Sample Name: Pdk 5 **Lab Number:** 3993100.1
Sample Type: Mixed Pasture (P1)

Analysis		Level Found	Medium Range*	Low / Medium / High
Nitrogen	%	3.9	4.0 - 5.0	
Nitrogen	%DM	4.1		
Phosphorus	%	0.46	0.38 - 0.45	
Potassium	%	4.2	2.5 - 3.0	
Sulphur	%	0.40	0.30 - 0.40	
Calcium	%	0.42	0.60 - 1.00	
Magnesium	%	0.17	0.20 - 0.30	
Sodium	%	0.301	0.150 - 0.300	
Chloride	%	1.18	0.30 - 2.4	
Dry Matter*	%	11.9	12.0 - 30.0	
Crude Protein	%DM	25.8	20.0 - 30.0	
Acid Detergent Fibre (seq)*	%DM	24.1	20.0 - 30.0	
Neutral Detergent Fibre*	%DM	44.1	30.0 - 45.0	
Lignin*	%DM	4.3		
Ash*	%DM	12.8	7.0 - 14.0	
Organic Matter*	%DM	87.2		
Soluble Sugars*	%DM	7.6		
Starch*	%DM	0.5 #1		
Crude Fat*	%DM	4.5		
Digestibility of Organic Matter in Dry Matter (DOMD)*	%	76.4	65.0 - 80.0	
Metabolisable Energy*	MJ/kgDM	12.2	9.0 - 12.0	
Non Structural Carbohydrate*	%DM	12.8		
OMD in-vivo*	%DM	87.6		
Grass Staggers Index*	me	3.0	(<1.8 recommended, >2.2 increased risk)	
K/Na Ratio*		14	(<10 recommended, >20 increased risk)	
Ca/P Ratio*		0.9	(>1.5 recommended, <1.2 increased risk)	
DCAD*	me/kg	627	(<200 recommended, >200 increased risk)	

Lots of numbers but take time to read and understand these!

- MJME, crude protein, ADF, NDF, lignin, soluble sugars, the main ones
- Macrominerals useful when making magnesium, calcium, phosphorus and sodium supplement recommendations
- Calculate DCAD for springer paddocks
- We can discuss any other aspects further today!

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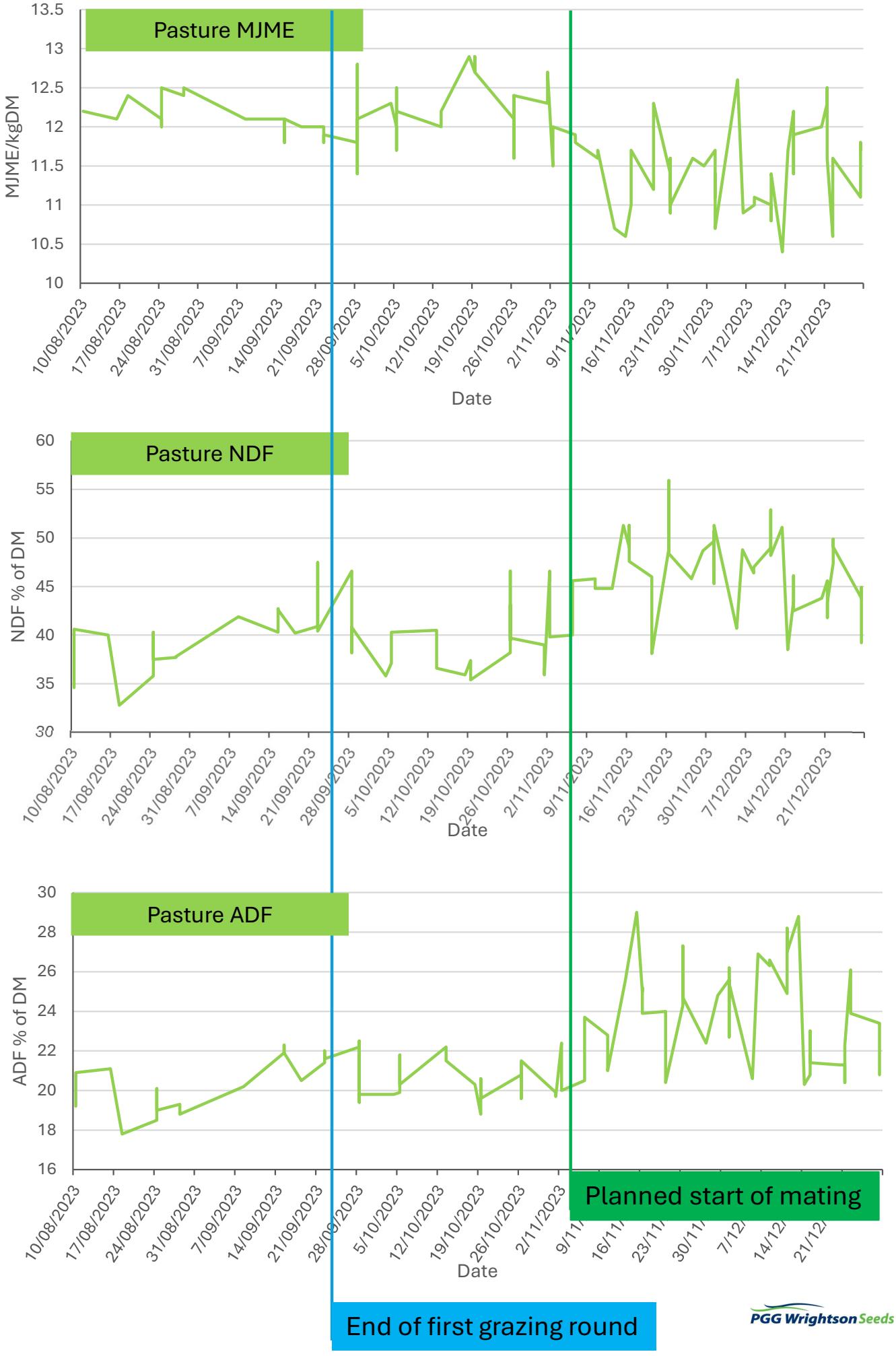

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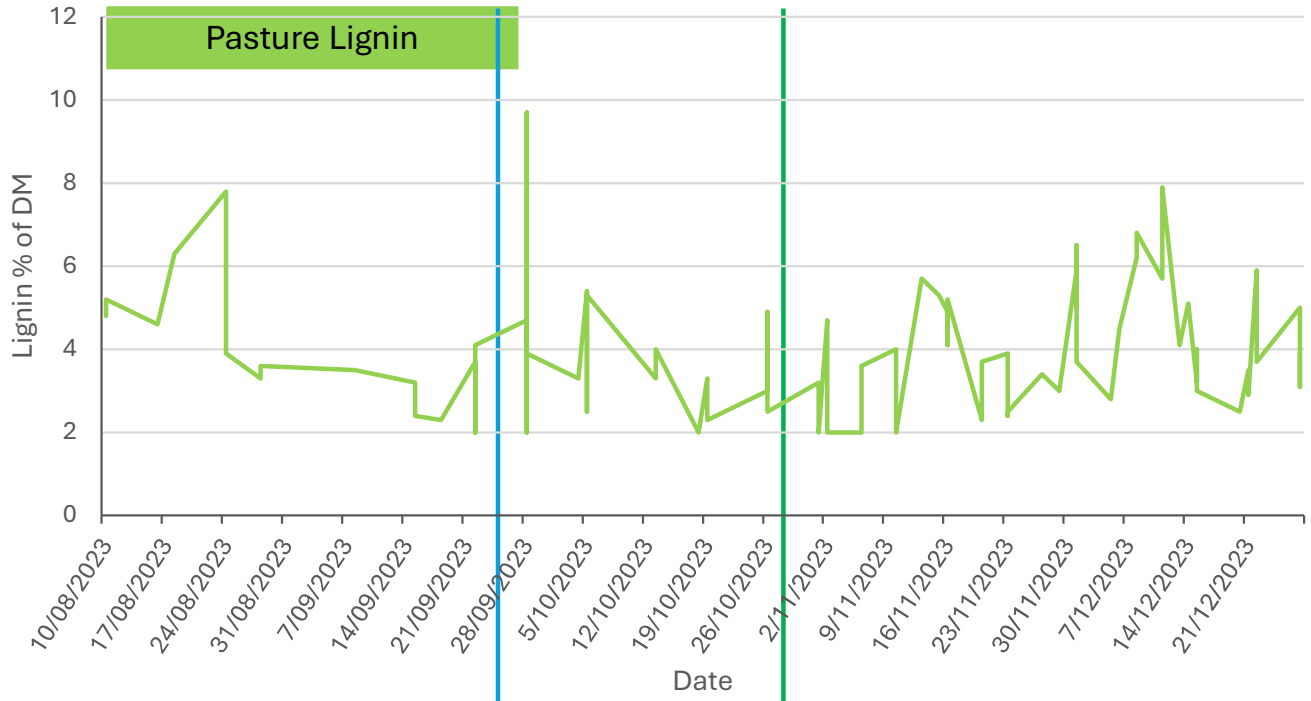

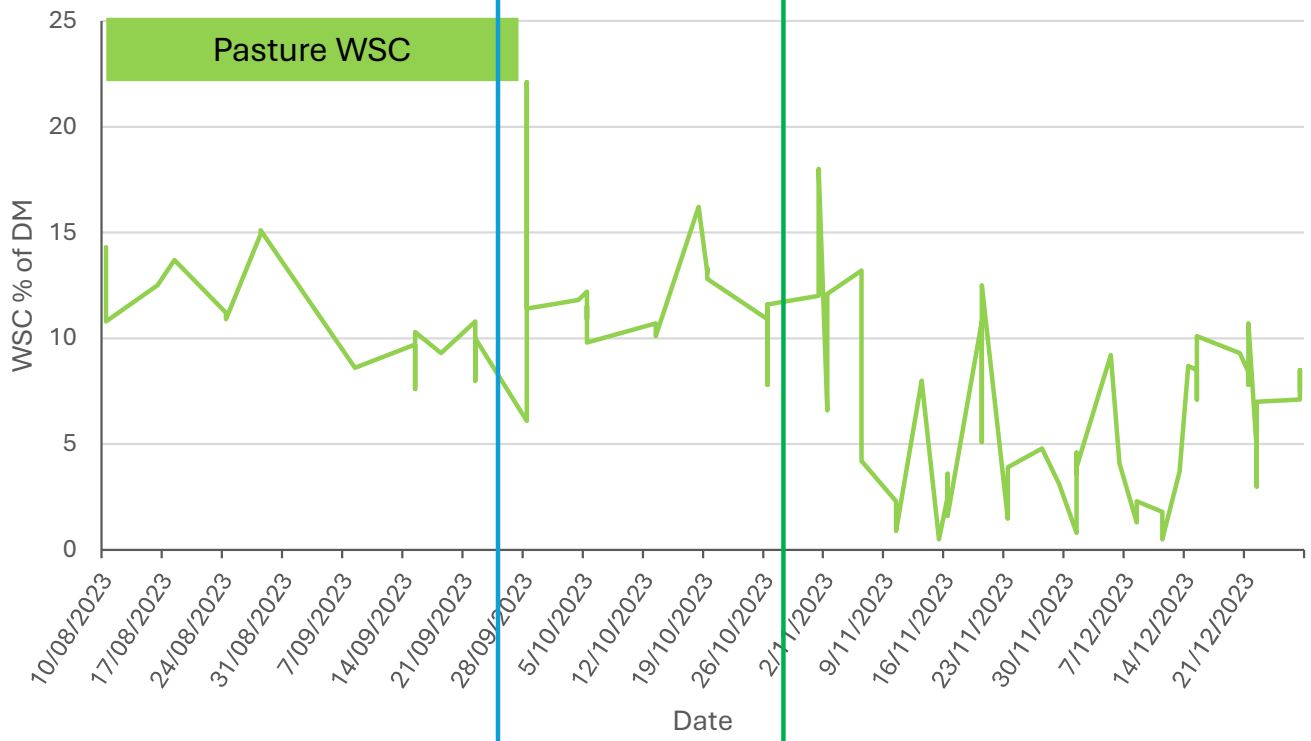

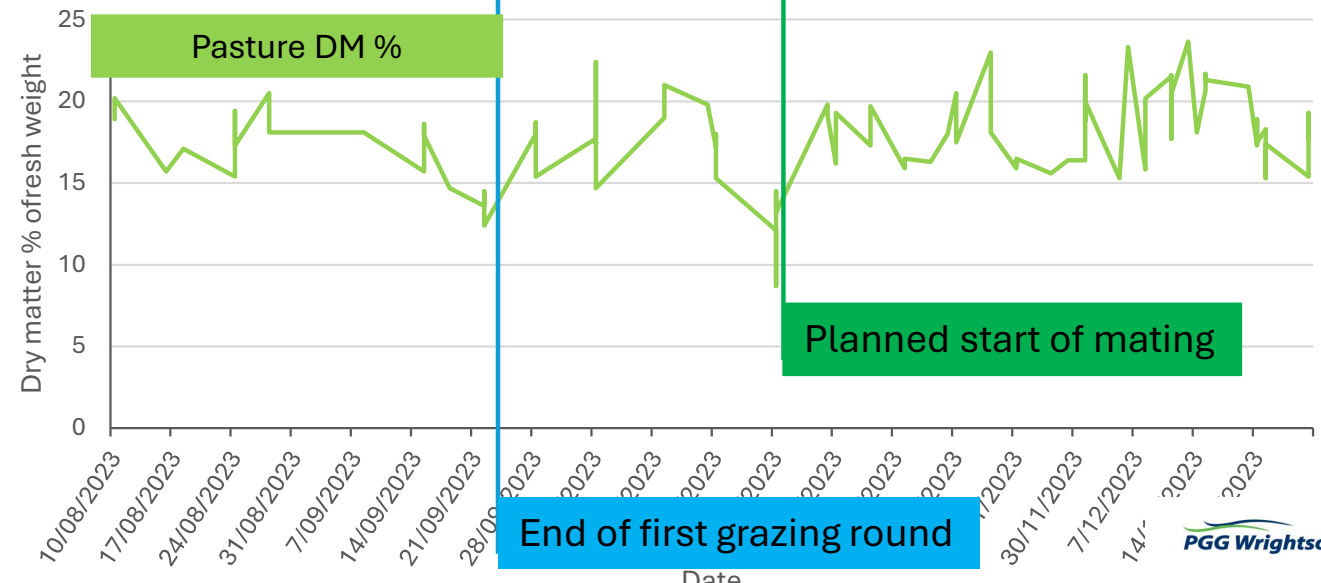

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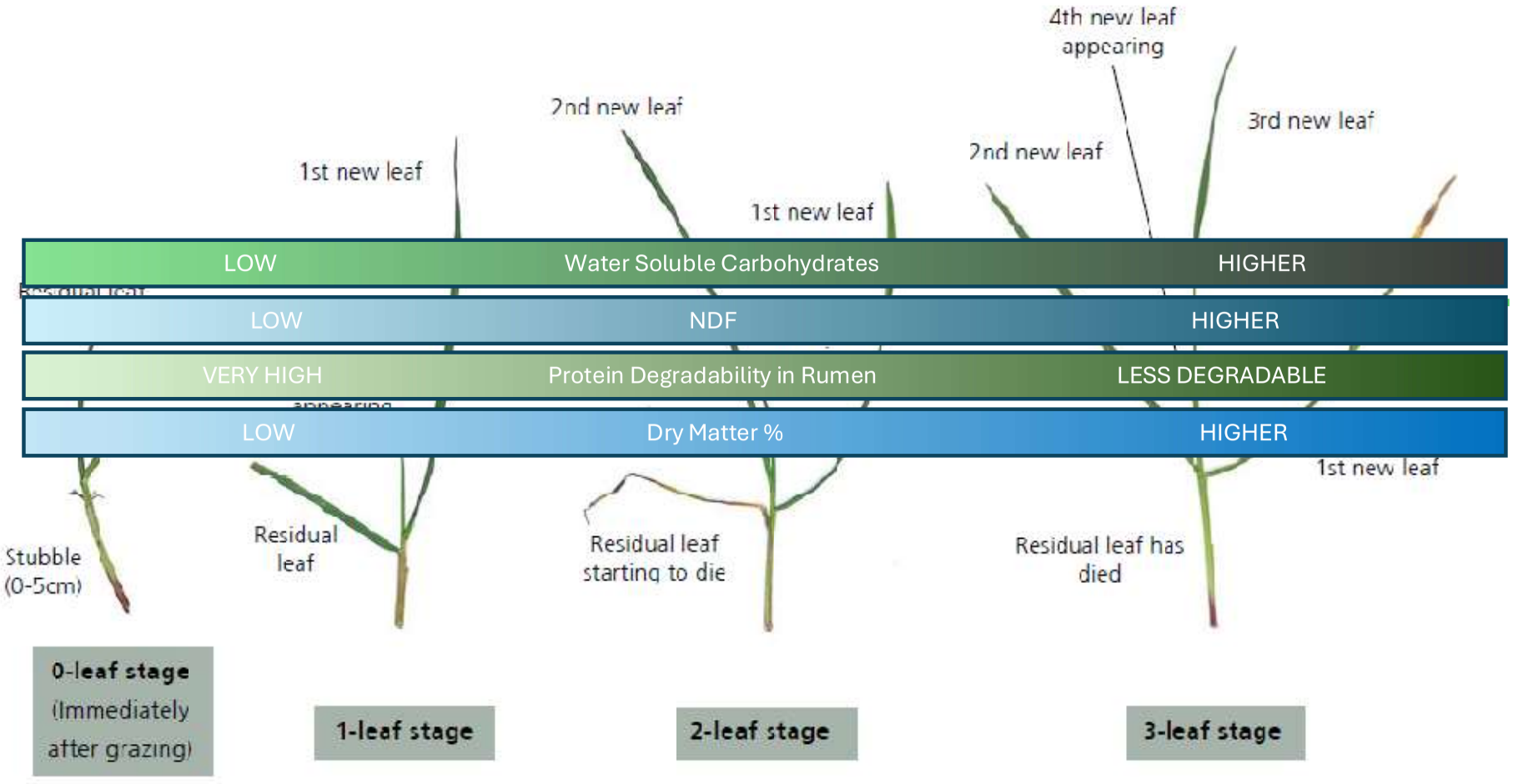
Qualty of ryegrasses changes depending on leaf emergence / number of leaves



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2. Spending time with the cows to assess pasture quality

(a) **Pluck samples of pasture**

- Pretend that you are a grazing cow!
- A cow will wrap her tongue around pasture to bite and tear it from the base of the plant.
- Use your hands to similarly tear the pasture from the base of the pasture plants. How difficult is it to tear the pasture away? Is it soft and easy to tear, or later in the spring is it hard or sometimes impossible to tear the pasture away? If you do tear pasture away, does some get left behind if it's too lignified and hard to break from the base of the pasture? Is the pasture soft and mushy, or is it springy and course? Are the leaf blades of grass soft or are they coarse and sharp (e.g. overly tall Tall Fescue grass blades).
- Compress the pasture in your hands – does it collapse and go more mushy, or is it springy and won't stay in the clump?
- If pasture is clean (no effluent, not been grazed by stock and no ag chem residues are present!!!), try chewing and tasting the grass – tough and fibrous, sweet, other flavours?
- Notice how the pasture (residuals, especially) feels as you walk across it, you can learn a lot. Especially in old worn, thin-soled pair of redbands!

(b) Sit with the cows, observe and listen

- How are the cows grazing? Is it easy for them to harvest pasture, or are they working hard? As a bite full is torn from the plant, is the tear clean and even or are there uneven residuals being left behind?
- Listen to cows as they eat, soft grass means soft sounds, hard, reproductive structure ryegrasses mean a different, harsher eating sound by the cows.
- Rumen function and pasture. As pasture quality changes, so does rumen function. Sometimes with second around pasture, cows don't chew their cud as much as when they consume first round grass – lower NDF, and the NDFd can be higher than for first round grass. Observe the cows, what proportion are chewing cud? How full are they in the rumen (rumen scoring).
- Dung consistency. Highly variable depending on pasture quality, pasture DM% and other feeds in the diet. Look at consistency and also between-cow variation in consistency.

3. Pasture Quality and First / Second round pasture

(a) **First ground autumn/winter saved pasture quality**

- Pasture quality variable (green leaf vs. dead matter) influenced by:
  - Pasture mass (kgDM/ha) in Autumn – too high, carries poorly.
  - Winter pasture growth rates.
  - Damage to pasture (frost, snow).
  - N use in the autumn.
  - Pasture species (ryegrass type especially), weeds present.
  - At what stage during the first round is the that autumn saved pasture going to be grazed? Taller pasture later in round may decline in quality (Leo will talk more about this)

(b) **Second round pasture quality**

- Often the best pasture quality of the year. Compared to autumn/winter saved pasture:
  - Higher MJME, high crude protein, moderate WSC.
  - Lower NDF, ADF, lignin.
  - Rapid rate of breakdown in rumen of crude protein (high RDP) and NDFd (digestibility of NDF) is high.
  - DM% often but not always lower than first round pasture.

4. Methods for improving pasture quality heading into and through mating

(a) **Grazing management**

- Tidying up first round residuals so a thatch / clumps aren't left behind
- Take genuine surpluses as baleage or silage = high quality regrowth coming back into the round.
- Strategic topping (Leo to cover this).
- N use – N deficiency can stress ryegrass plants, poorer quality - but do adhere to best practice use of N.
- Leo will talk more about grazing management in our next session.

(b) **Pasture species and different cultivars**

- **Clover** presence in pasture sward
  - Higher quality than ryegrass and won't lose quality when flowers as ryegrass does.
  - Nitrogen fixation delivers more N to ryegrasses, improve their growth and potentially ryegrass quality.

- **Herbs** – Plantain, chicory if can establish / keep these in the sward (weed control may be tricky).

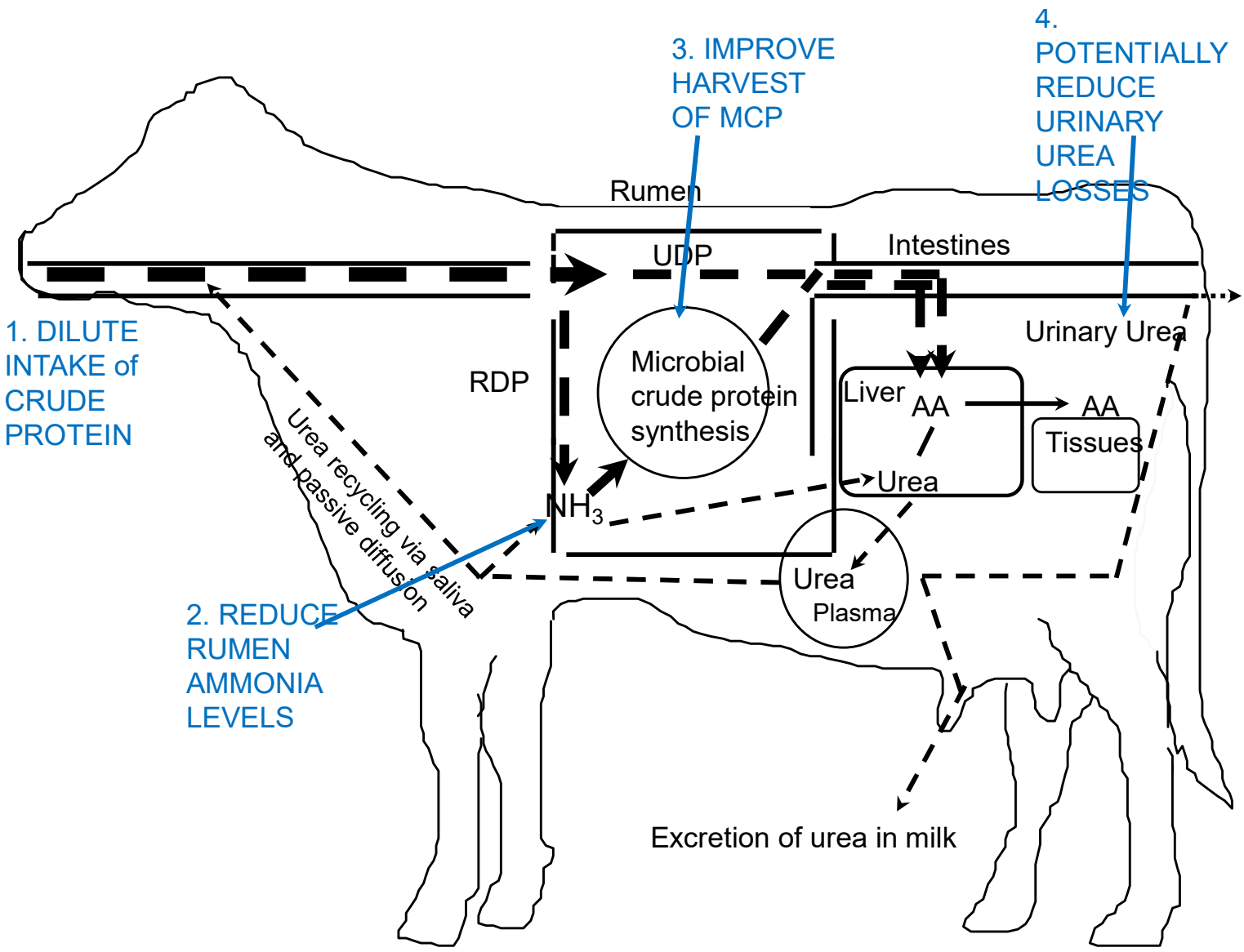
- **Choose your ryegrasses carefully**
- Italian ryegrasses excellent for early cool season growth but typically will have poorer quality when reproductive development gets underway compared to perennial ryegrasses.
- Mid season "day zero" perennial ryegrasses (PRG) flowering/seed head emergence = drop in pasture quality.
- 22 October mid season ryegrasses 50% seedhead emergence (if you let them get that far)!
- Nui is standard reference ryegrass = "Day Zero" of heading.
- If whole farm has been planted in the same ryegrass, quality "crashes" at the same time if seedhead emergence.
- Regrassing – portfolio approach to different heading dates to spread ryegrass quality "crash", late October onwards.
- E.g. Midway diploid PRG (+3 days), Accrue diploid PRG (+22 days), Base tetraploid PRG (+22 days), Vast tetraploid PRG (+36 days).

Midway DIPLOID PERENNIAL RYEGRASS Accrue DIPLOID PERENNIAL RYEGRASS Base TETRAPLOID PERENNIAL RYEGRASS Vast TETRAPLOID PERENNIAL RYEGRASS

(c) **Tetraploid vs. diploid ryegrasses**

- Tetraploids tend to hold better ryegrass quality than diploid ryegrasses and remain relatively tastier / appealing to cows than diploid ryegrasses

Milk Urea



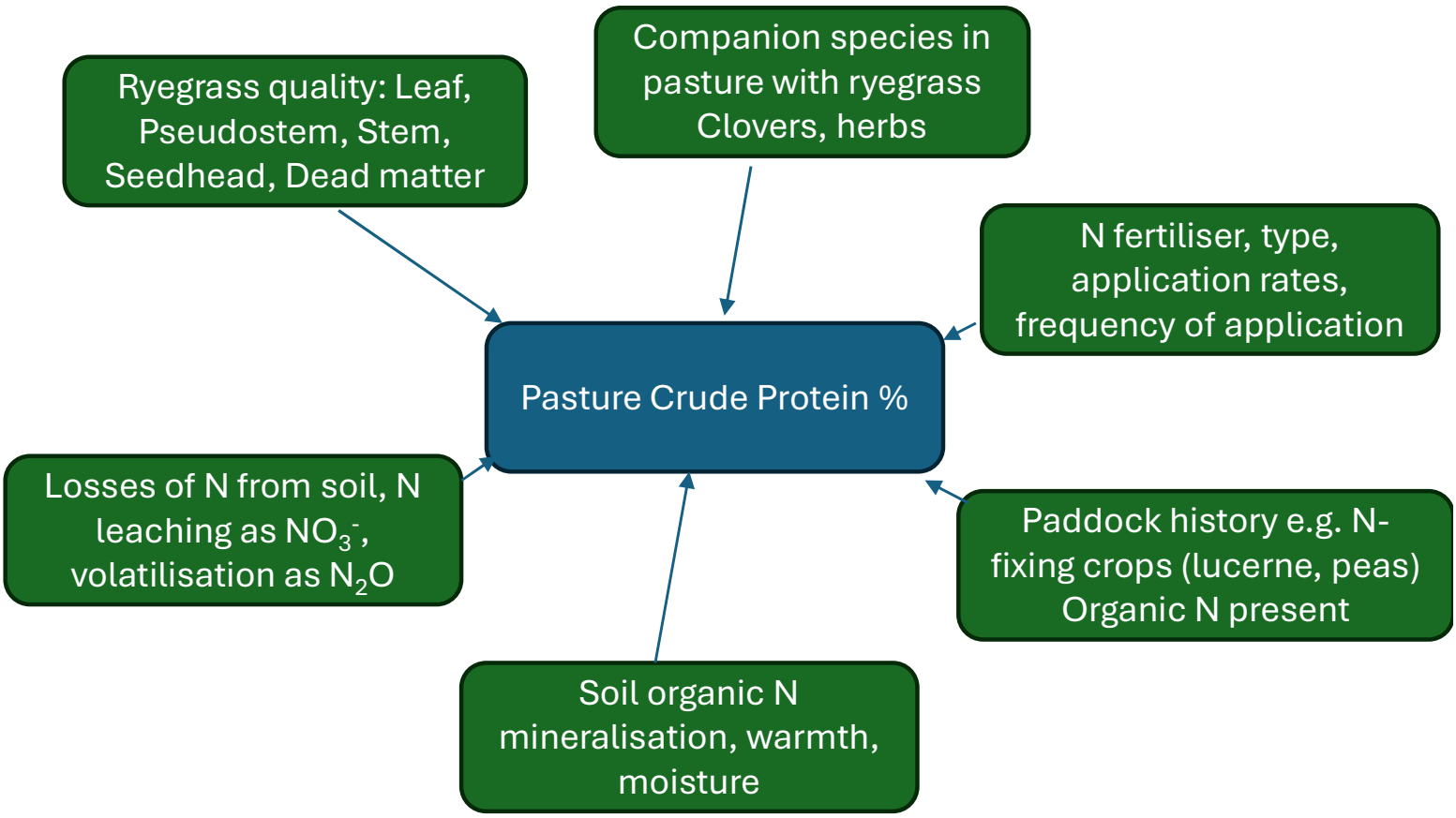
Milk Urea

- Urea is simply a byproduct of the breakdown of dietary crude protein (CP) in the rumen. Some urea also comes from the breakdown of e.g. muscle and other tissues during normal 'remodelling' of body tissues, as well as amino acids released from undegraded dietary protein (UDP)
- When part of feed CP breaks down in the rumen (= rumen degradable protein; RDP), rumen bugs produce a lot of ammonia (NH_3). NH_3 is toxic to the cows body tissues, so in the liver NH_3 is converted to urea. The cow gets rid of urea via the urine.
- Urea reaches all parts of the body in the bloodstream – before it is excreted in the urine. Being only a very small molecule, urea passes into the udder and milk – so we can monitor milk urea as a very rough "proxy" for amount of dietary CP, particularly the amount of RDP being broken down in the rumen

Milk Urea (MU) in pasture-fed cows

- Southland has some of the best quality temperate ryegrass / clover pastures in New Zealand, if not the world.
- Levels of CP in pasture vary greatly, even in Southland, changing with many factors

Things that influence concentration of crude protein in pastures



No wonder herds fed 100% pasture have such a variable MU!

- Given the typically very high levels of CP in Southland pastures from both ryegrasses and from clovers, for 100% pasture-fed cows it's not surprising to have high MU levels in the milk.
- MU concentrations vary through different parts of the year and with the diet. Cows that consume low protein feeds as part of their overall diet will have lower levels of MU.
- Many farmers and rural professionals from overseas are often surprised by the high MU levels in the milk from most New Zealand cows. In TMR based herds high MU indicate that there is too much protein in diet and protein is being wasted and the TMR formulation is changed to stop protein wastage.
- For pasture-fed cows high MU shows that protein is being wasted but for many herds we can't do much about this if we're only feeding pasture.

Should we worry about milk urea (MU) concentrations in our herds?

There are two main reasons why MU gets talked about:

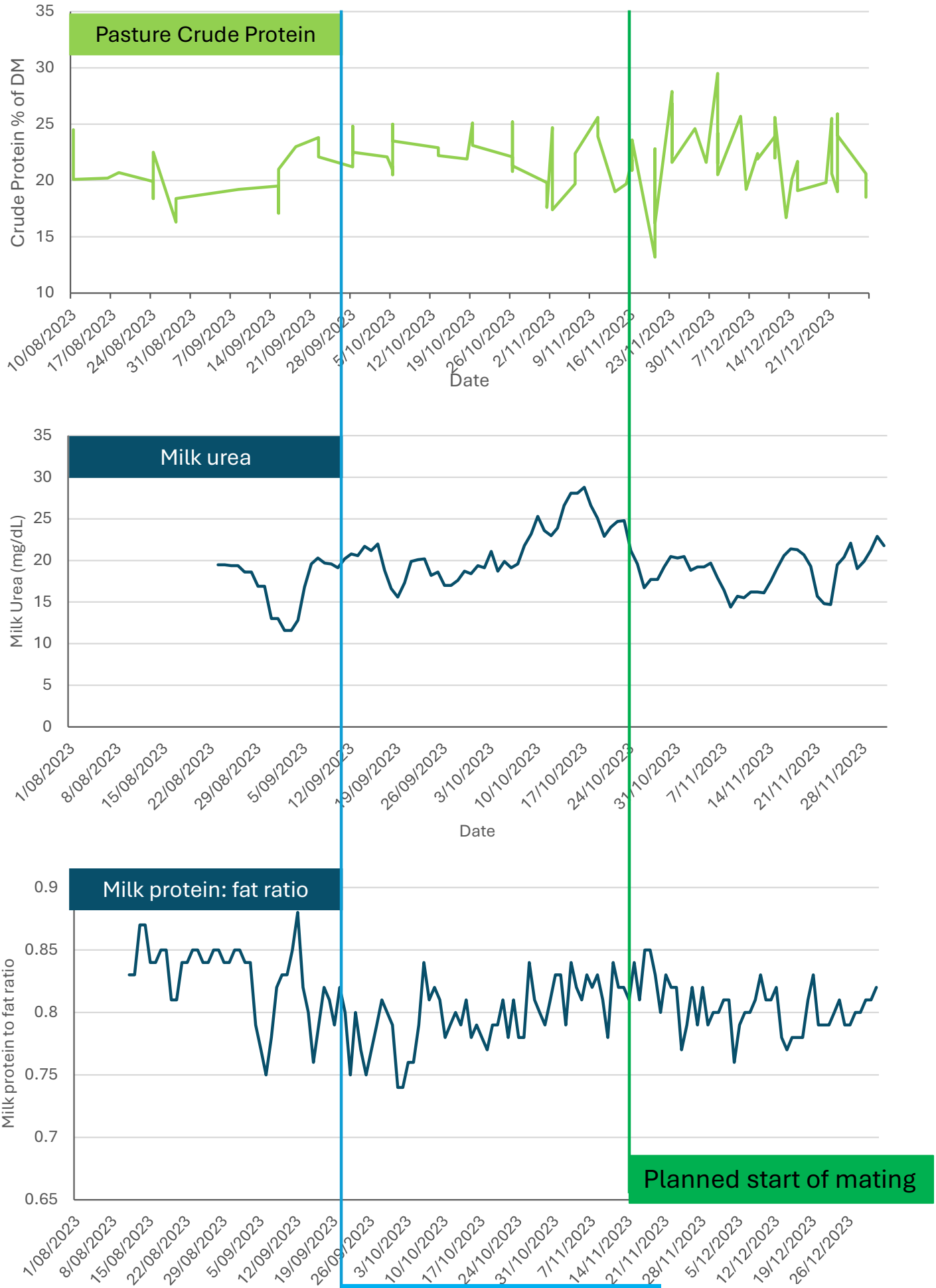
1. Low MU

- Low MU can sometimes mean that levels of dietary crude protein (CP) may be too low. This can happen in early lactation, but also when we feed low CP supplementary feeds e.g. during a drought, feeding maize silage or cereal silages plus cereal grains that might not deliver enough dietary CP.
- The key "takehome" is that low MU is not always to do with the diet, other factors can contribute to low MU. Non-dietary factors that change MU include stage of lactation, cow genetics, heifers vs. mixed age cows, cow liveweight, and milksolids yield.
- Before deciding to feed supplementary dietary sources of protein to cows in early lactation, instead feed test pasture and supplementary feeds to check CP levels. It's risky to unnecessarily provide addition high quality protein sources in early lactation in the absence of justification by checking dietary CP. Not only are protein supplements expensive, but high quality amino acids provided to early lactation cows in the absence of sufficient dietary energy promotes milk production at the expense of loss of body condition - risky for cows due to be mated in the coming weeks.

2. High MU

- High MU implies that dietary CP is being wasted, also that urinary N losses are likely inappropriately high. DairyNZ is currently looking into the relationship between MU and urinary N losses. Interestingly although MU and urinary N are related, the relationship is not as strong in New Zealand pasture-fed cows compared to cows eating TMR diets.
- Reduced 6-week in calf rate is often blamed on high dietary protein (and high MU), through low conception rates and/or loss of pregnancies.
- We need to be careful to not adjust diets specifically to reduce MU. Conception failure is often due to many *other* factors, not just a surplus of dietary CP. Research suggests that cows can be somewhat tolerant of high dietary CP provided they are gaining, not losing body condition at the same time they're eating high CP. A positive energy balance seems the key for cows to still conceive in the presence of high dietary CP (and high MU).

You can listen to a Rumen Room podcast by Charlotte Westwood to learn more about MU interpretation. 15. Milk urea in pasture-fed dairy cows - The Rumen Room Podcasts | Podcast on Spotify



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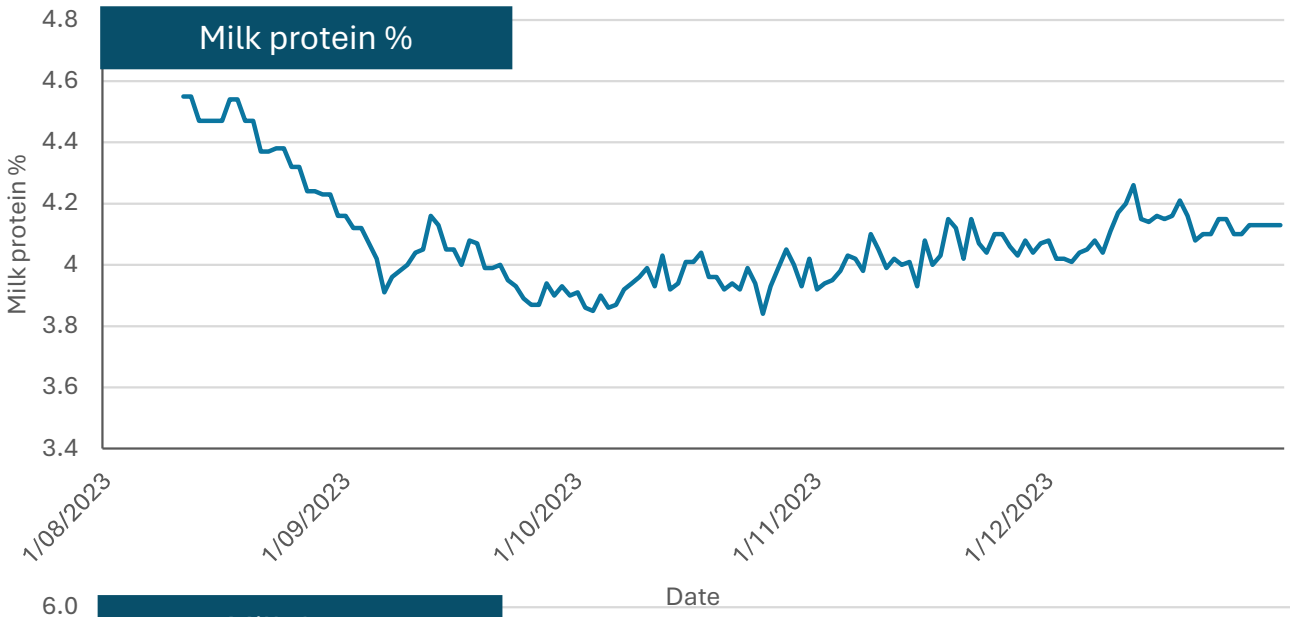

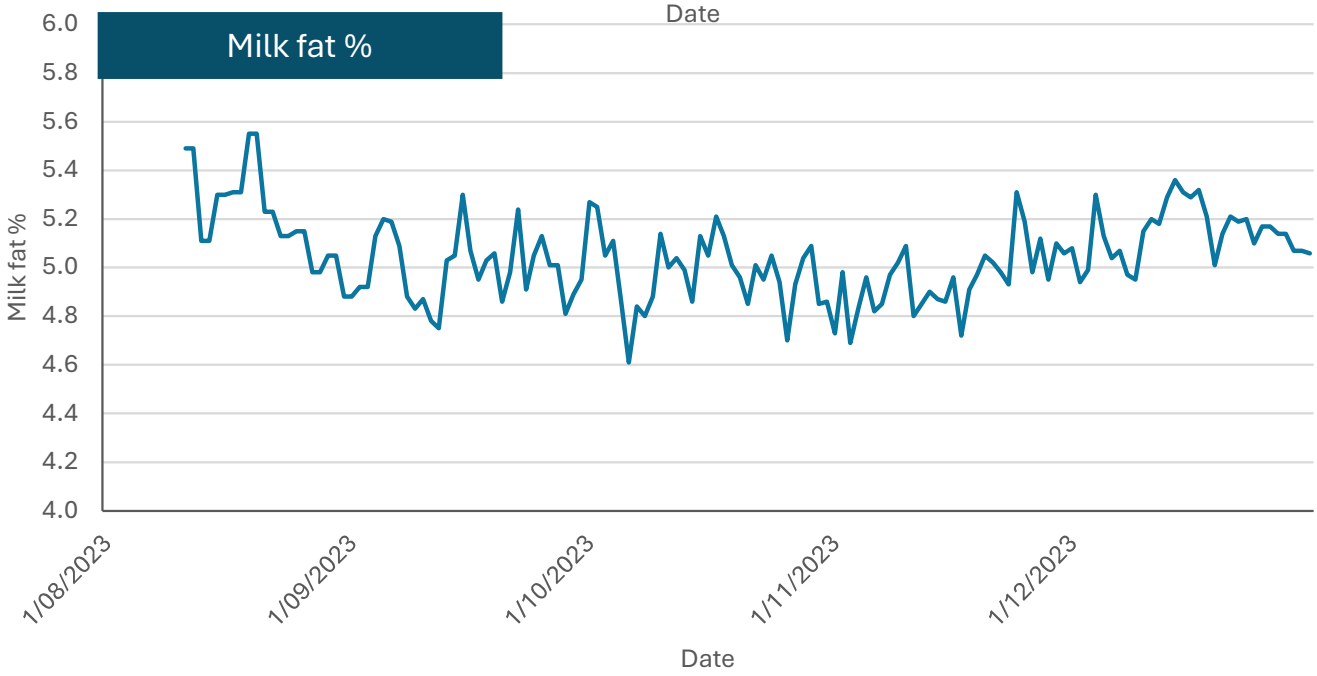

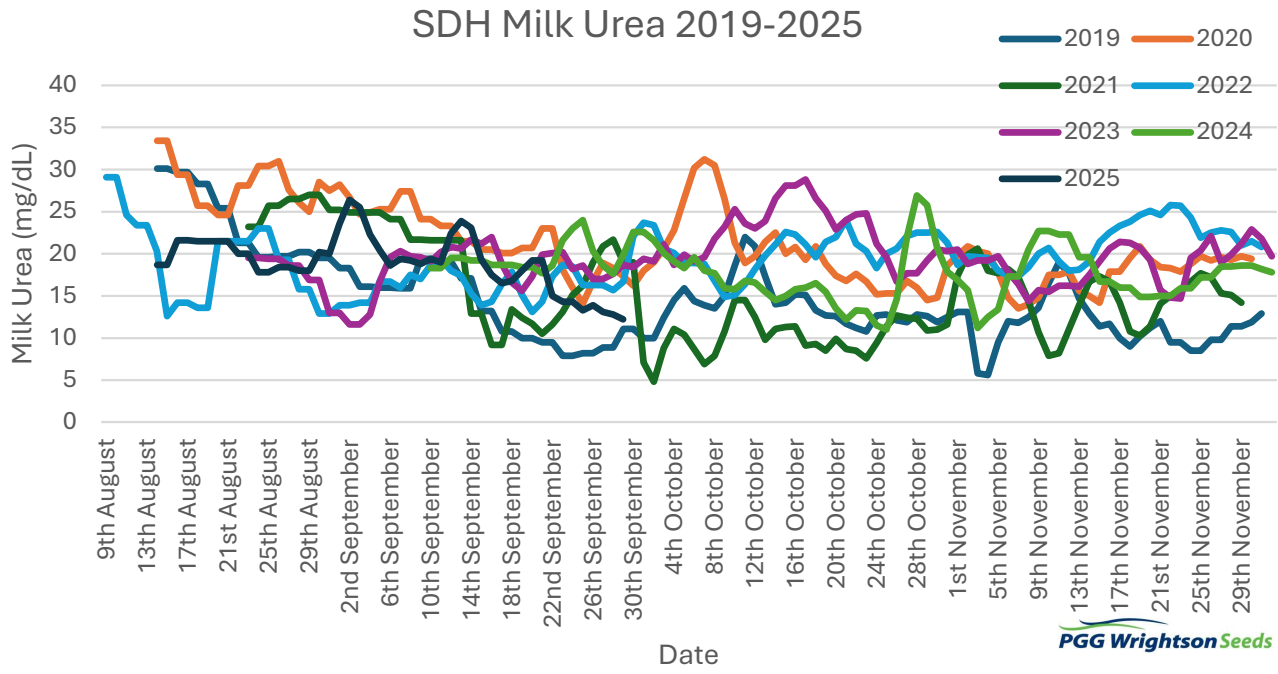

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