

# Dairy wintering research: Winter Grazing Seminar 11<sup>th</sup> & 12<sup>th</sup> May 2021

**Dawn Dalley, Senior Scientist, DairyNZ**



and the SDH  
farm team



# Presentation Outline

Wintering system changes since the nineties

Learnings from Southern Wintering Systems

Current SDH wintering research

Achieving wintering taskforce rules

# Wintering has come a long way in 30 years

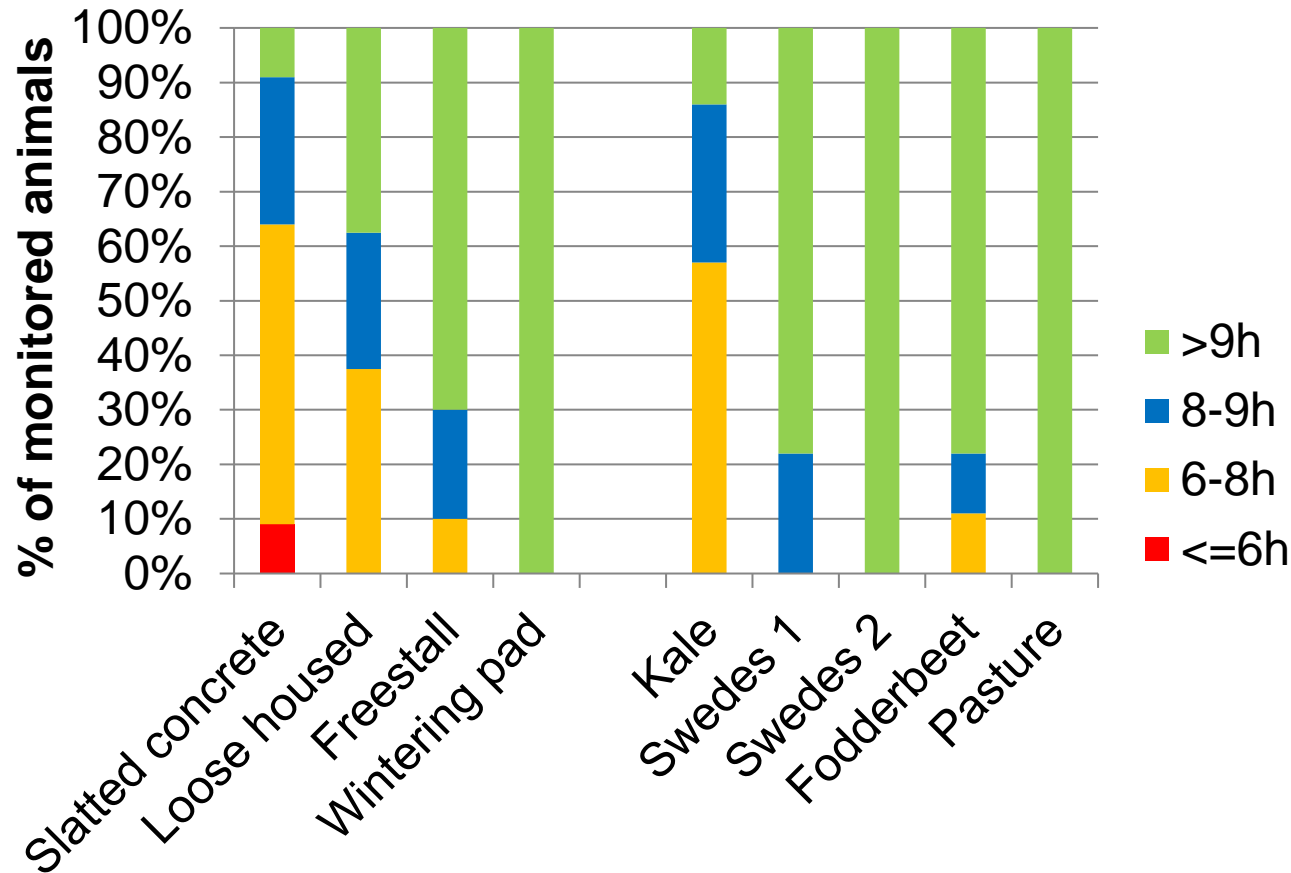
1990's	2000's	Now & the Future
Tonnes of DM of highest quality	Importance of utilization not just DM offered	All of the previous considerations <b>PLUS</b>
Lowest cost	Achieving BCS targets – animal level metrics	Animal welfare & sentience
Lower levels of accuracy and understanding	Setting up for the next season	Biosecurity
Herd level metrics	More mathematical approach	Environment
Getting a winter holiday	Owners wanting more control of outcomes	Public perception
	Productivity driven	Consumer expectations



# Southern Wintering Systems (2010-2014)



# Range of lying behaviour across systems & farms





***SDH Vision: to be an internationally recognised, innovative and leading centre of excellence for dairy farming, comparative research and extension***

## **Farmer priorities in 2017**

- **Wintering**
- **Fodder beet**
- **Nutrient loss reduction**
- **Infrastructure**



# Southern Dairy Hub

## Farm Systems Comparison DairyNZ 2022-2025

Off Paddock Infrastructure  
DairyNZ 2021-2025

Crop establishment methods for  
better wintering outcomes 2021

National forage cultivar evaluation  
trial NZPBRA 2020-2025

Forage value index validation  
DairyNZ 2017-2022

Connected Farm NZBIDA  
AgResearch 2019-2020

MPI Blood sampling  
AgResearch 2020-2022

Milk molecule phenotyping AgResearch 2019

Feed impact on milk composition Fonterra 2017-2019

## Future Projects

## Pasture Studies

## Sample Supply

## Animal Performance

## Animal Behaviour

## Water Quality

SFF Participatory Research  
DairyNZ 2018-2022

SFF Making Fodder Beet Sustainable  
DairyNZ 2018-2022

Crop type effect on calf traits  
DairyNZ 2018-2022

Weather & soil effects on animal  
behaviour DairyNZ/AgR 2020

Blood indicators of stress  
AgResearch 2020

Crop type and allocation effects on Lactation & behaviour DairyNZ 2017-18

Crop type and R1 feeding behaviour (Honours) DairyNZ 2019

Measured N Leaching AgResearch  
2018-2021

Linear Lysimeter for measuring leaching  
AgResearch 2019-2022

Drain discharge mitigation options (Honours) AgResearch 2020

Mapping the tile drain and streams Ag Research  
2017-2019

## Farm Systems Comparison DairyNZ 2018-2022



# Winter 2017

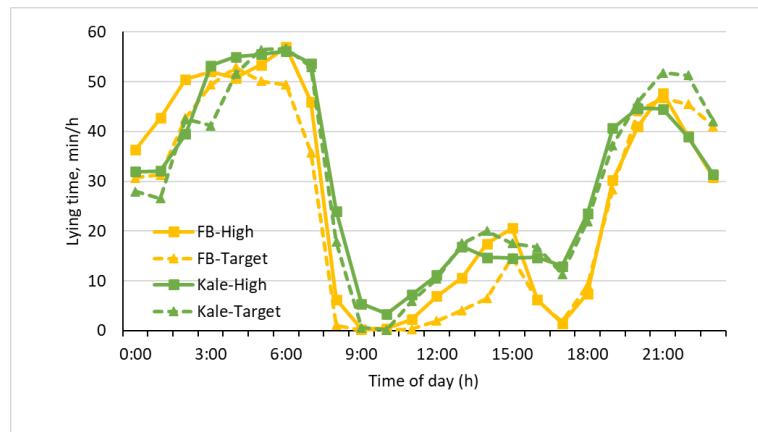
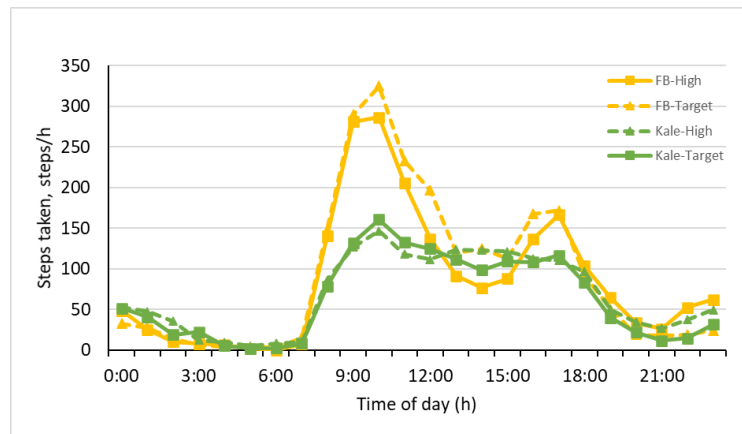
Level of feeding did not affect behaviour

Cows grazing kale lay for longer and walked less than cows grazing beet

Cows grazing beet had fewer, longer lying bouts

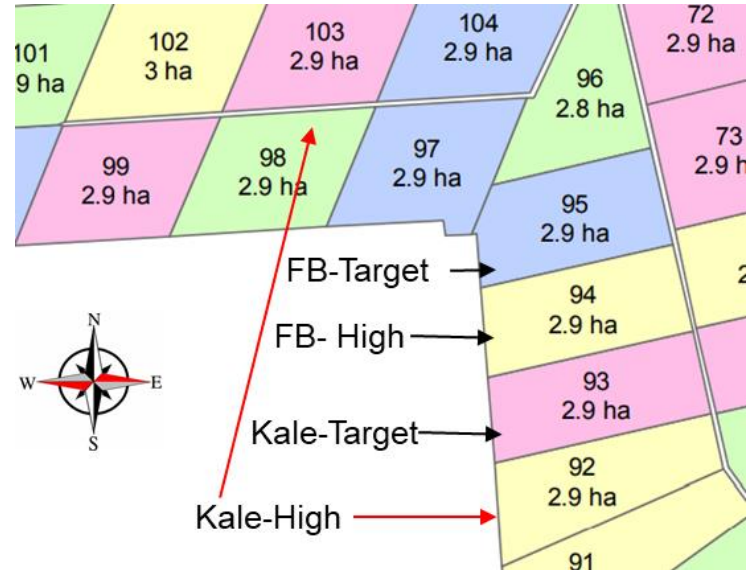
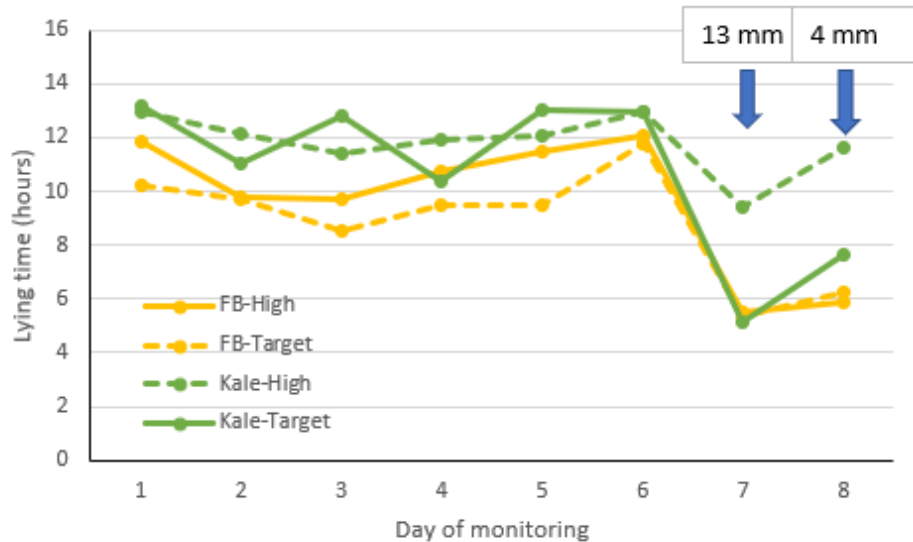
Cows grazing beet walked a lot during feeding

	Fair Weather 5-8 hrs sunshine, no rain, max temp 6.5-11.7 °C			
	FB High	FB Target	Kale High	Kale Target
Lying (hrs)	11.3	10.4	12.4	12.5
Bout No.	7.2	6.1	10.4	9.9
Bout duration	100	112	80	89
% lying <8h	13	24	0	0
Steps	1914	2222	1513	1515





# Weather conditions significantly impacted lying behaviour



# Cumulative effects: whose calves are bigger??

Calves born to fodder beet dams were lighter, shorter & had a smaller girth



	Dam winter diet	Weight (kg)	Height (cm)	Length (cm)	Girth (cm)
2018 heifers	Fodder beet	29.2	69.2	57.7	72.5
	Kale	32.1	70.9	58.1	74.9
	% difference	9	2	1	3
2019 heifers	Fodder beet	29.5	68.1	55.7	73.2
	Kale	32.4	70.3	57.3	76.1
	% difference	9	3	3	4
2019 bulls	Fodder beet	30.8	68.0	55.7	75.0
	Kale	32.5	70.6	57.7	76.7
	% difference	5	4	3	2

# Winter 2020: Cow behaviour and soil conditions

## practical visuals linking soil conditions & lying behaviour



# No differences in soil conditions observed between fodder beet and kale paddocks



- pugging depth – 7.1 vs 5.5 cm
- % dry – 65 vs 66 %
- % wet – 33 vs 29 %
- % sodden – 3 vs 5 %
- % pooling – 27 vs 28 %



# Cows lying for longer had higher dirt scores



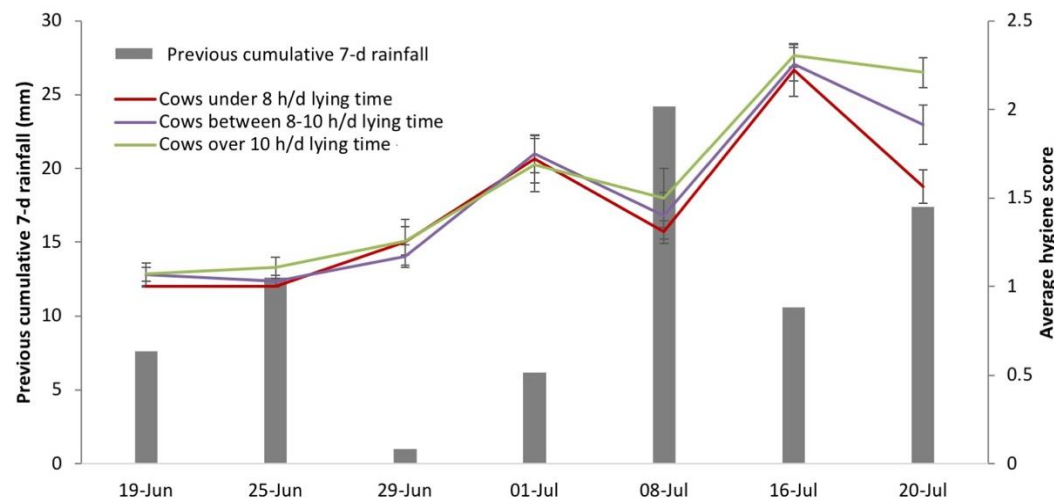
Manure or mud in either of the focal areas is less than 25 cm in diameter



Manure or mud is >25 cm in diameter in 1 of the focal areas



Manure or mud >25 cm in both the focal areas





A **ruler**, **gumboot score** and presence of **water pooling** are good measures to estimate true **mud depth** and **paddock wetness**



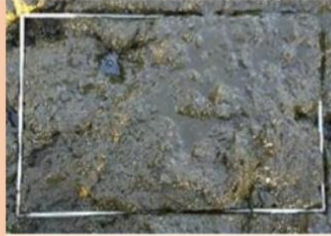
#### DRY

- Boot imprint dry and sides remain formed
- No liquid pooling
- If soil is held in hands, does not seep through fingers



#### WET

- Boot imprint wet, may be sticky and less defined
- Sides of imprint may begin to fall in but no liquid pooling
- If soil is held in hands, some seeping through fingers

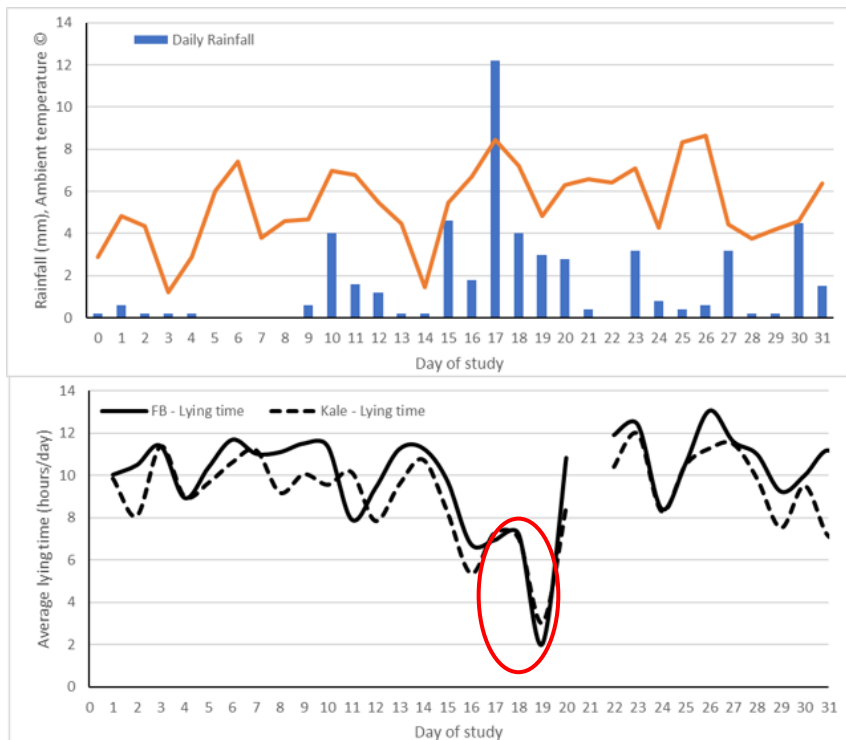


#### SODDEN

- Boot imprint disappears with sides falling in
- Liquid pooling obvious
- If soil is held in hands, seeping through fingers

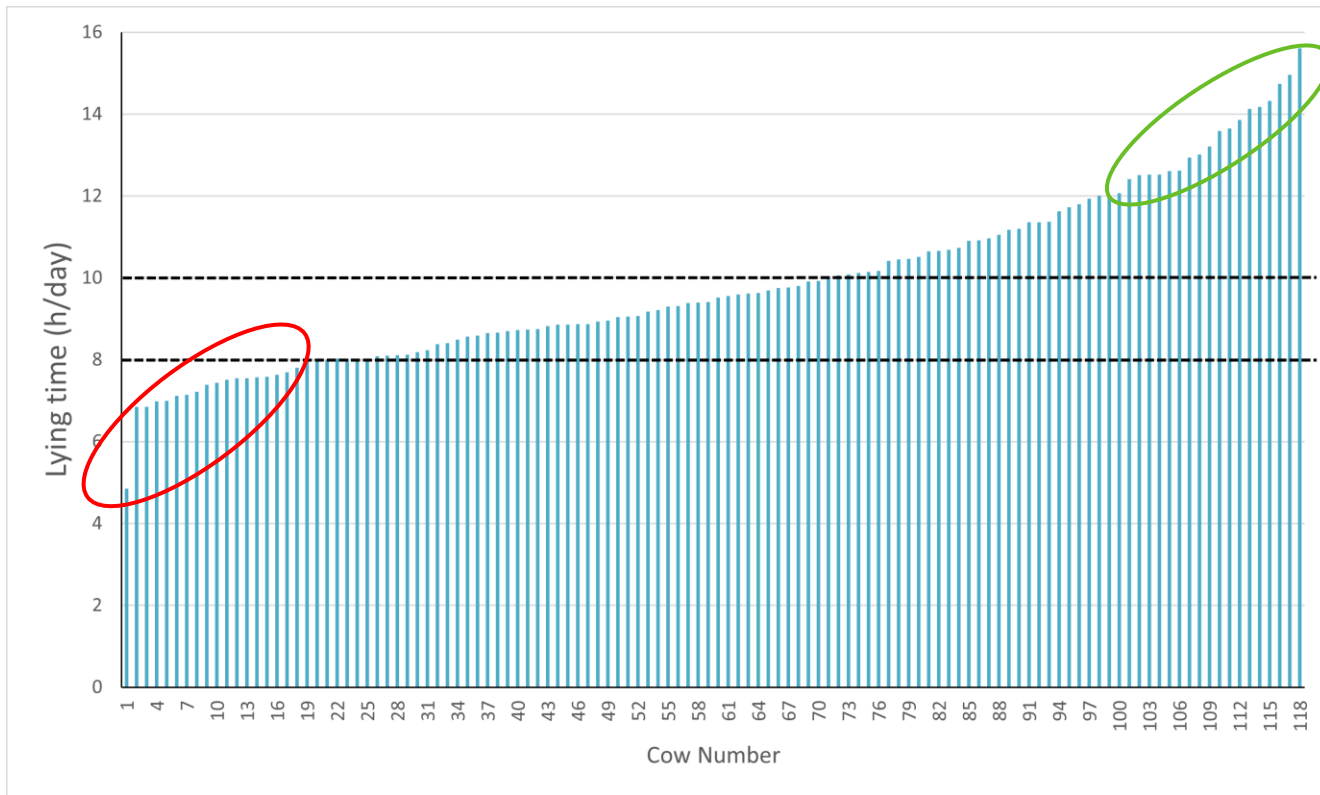


# Lying time decreased on the day of rain & the day after but rebounded two days later



- On rainy days cows had fewer, shorter lying bouts
- 2 days after rain lying bout duration was longer

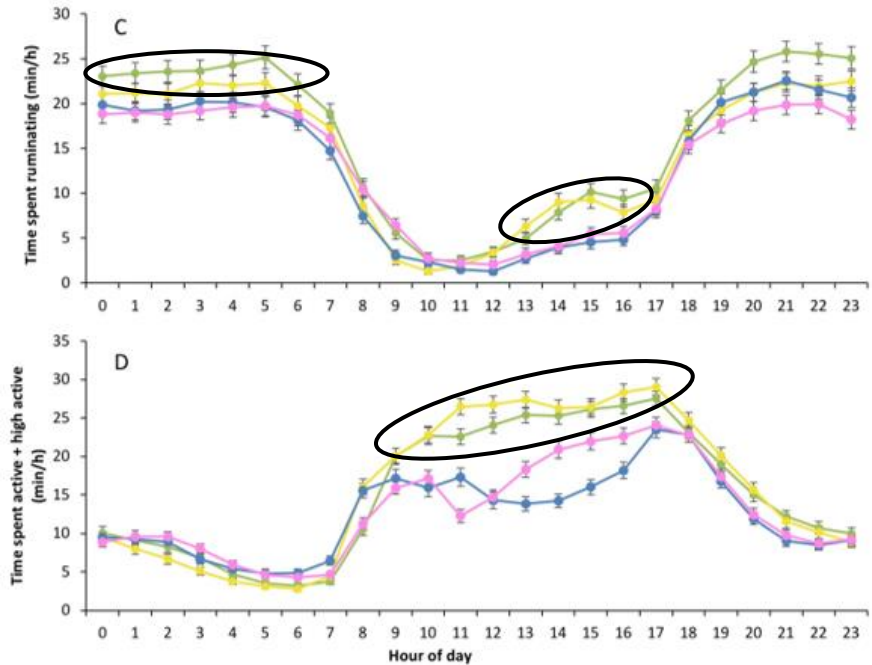
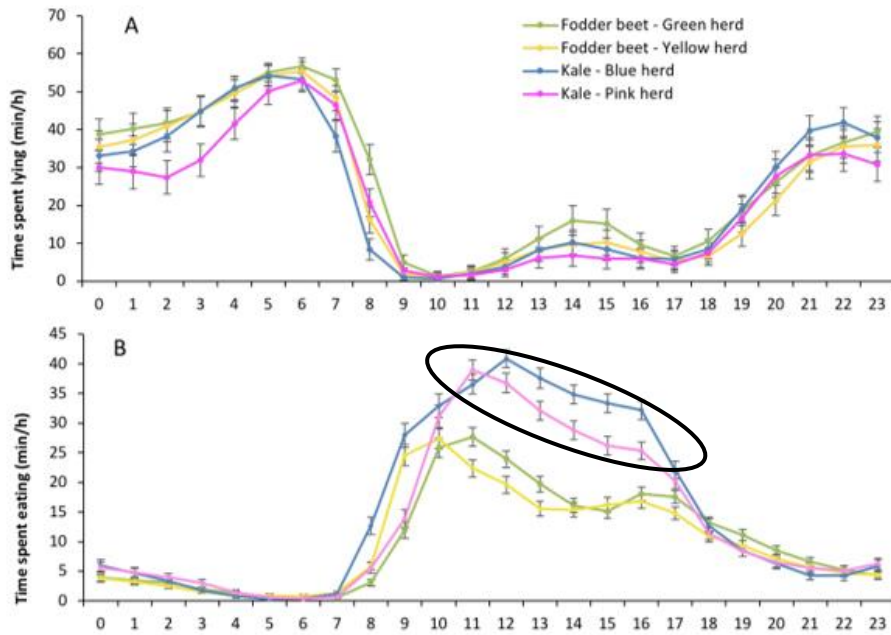
# Not all cows achieved the minimum recommendation of 8 h/day lying



# Younger earlier calving cows were in the 'at risk' group

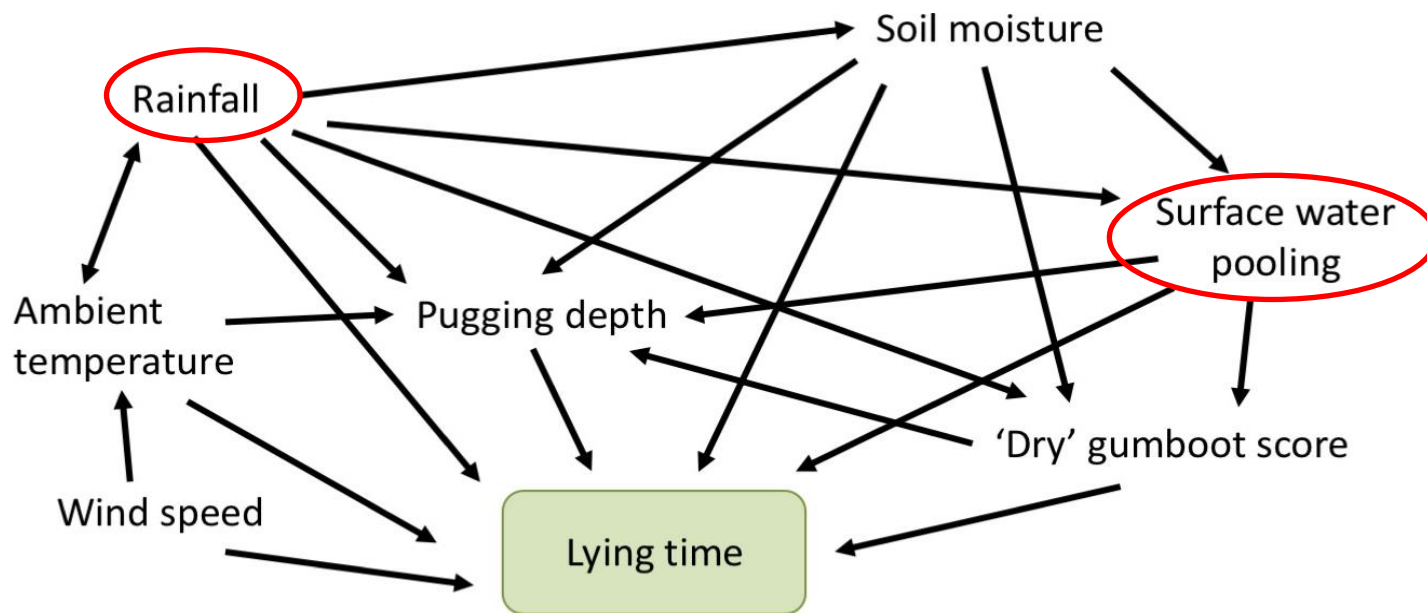
	Days pre-calving	Age	BCS
Less than 8 hrs lying	47	3.8	4.9
8-10 hrs lying	59	4.8	4.9
10-12 hrs lying	54	5.8	4.9
Greater than 12 hrs lying	58	7.1	5.0

**Kale** cows spent **more time eating** while **fodder beet** cows were **more active** and **ruminated** more

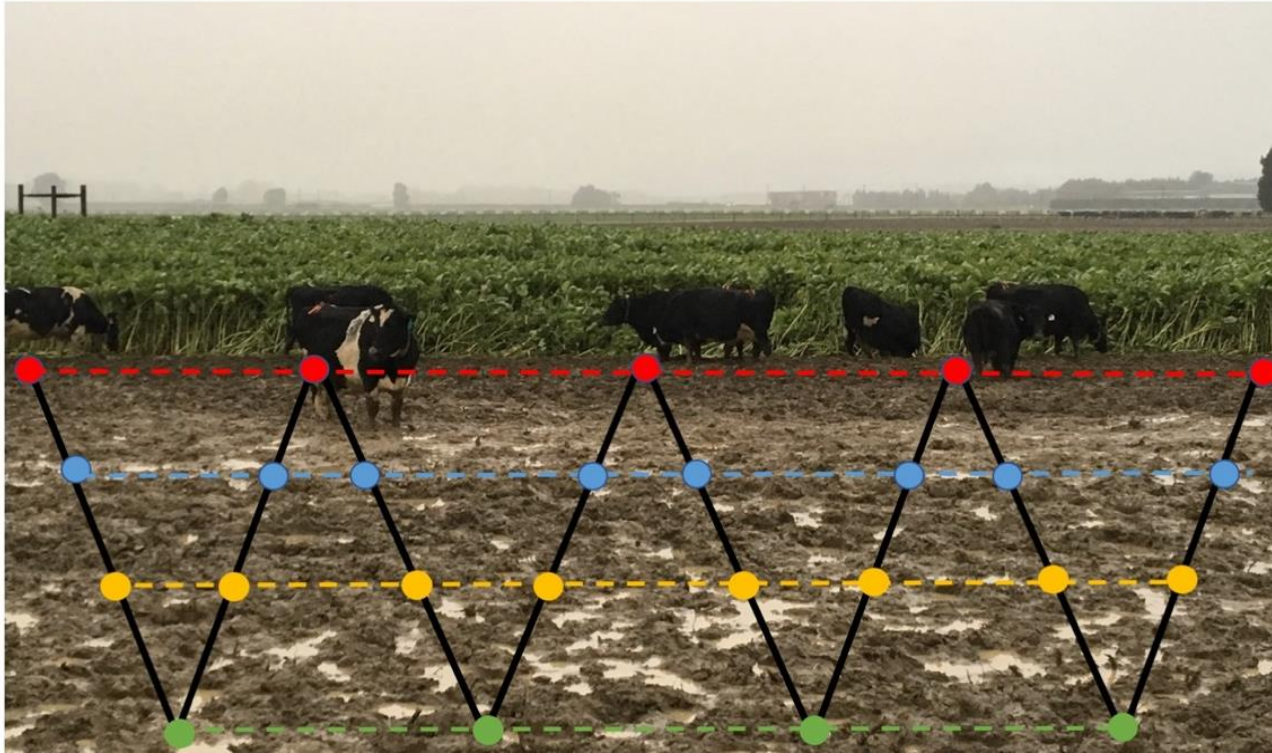






Many interacting factors affect lying but **surface pooling** appears most useful and this is closely linked to **rainfall**



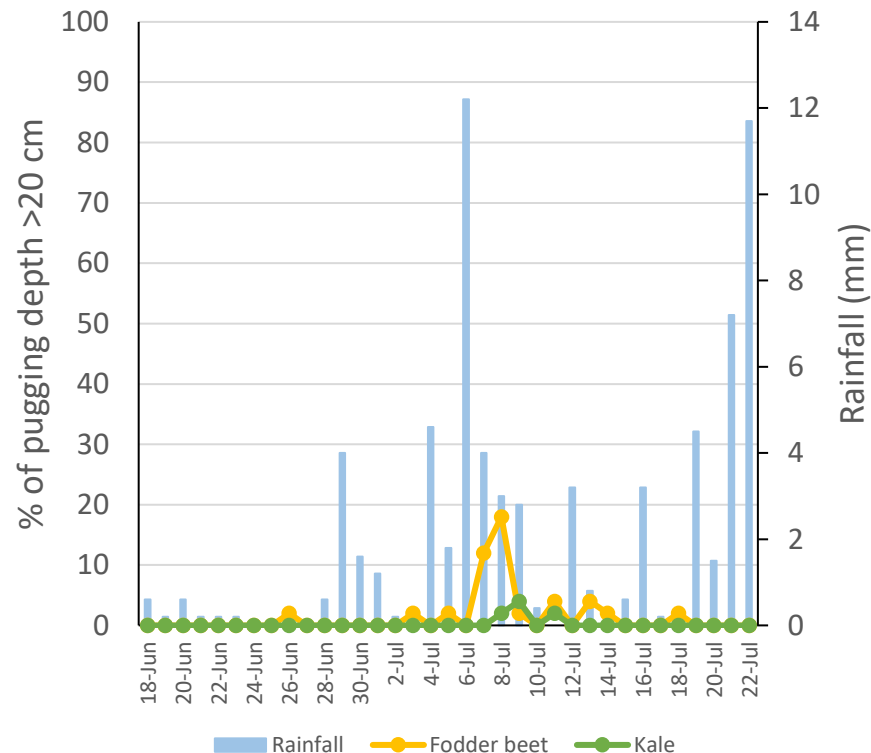
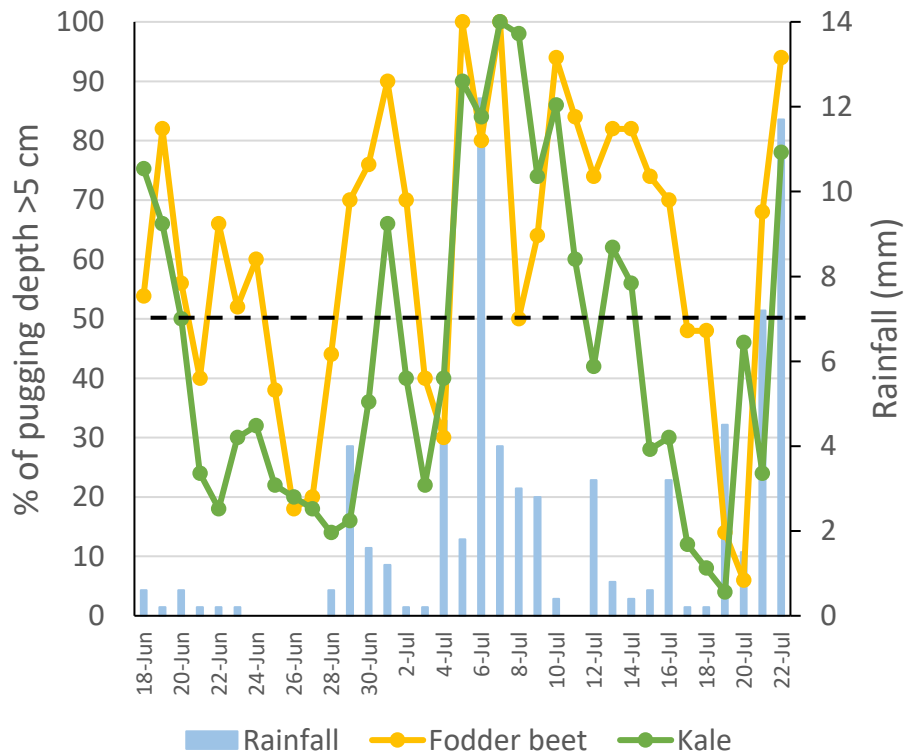
Area closest to the feed face was driest:  
set paddocks up to **protect this area** from  
pugging during weather events



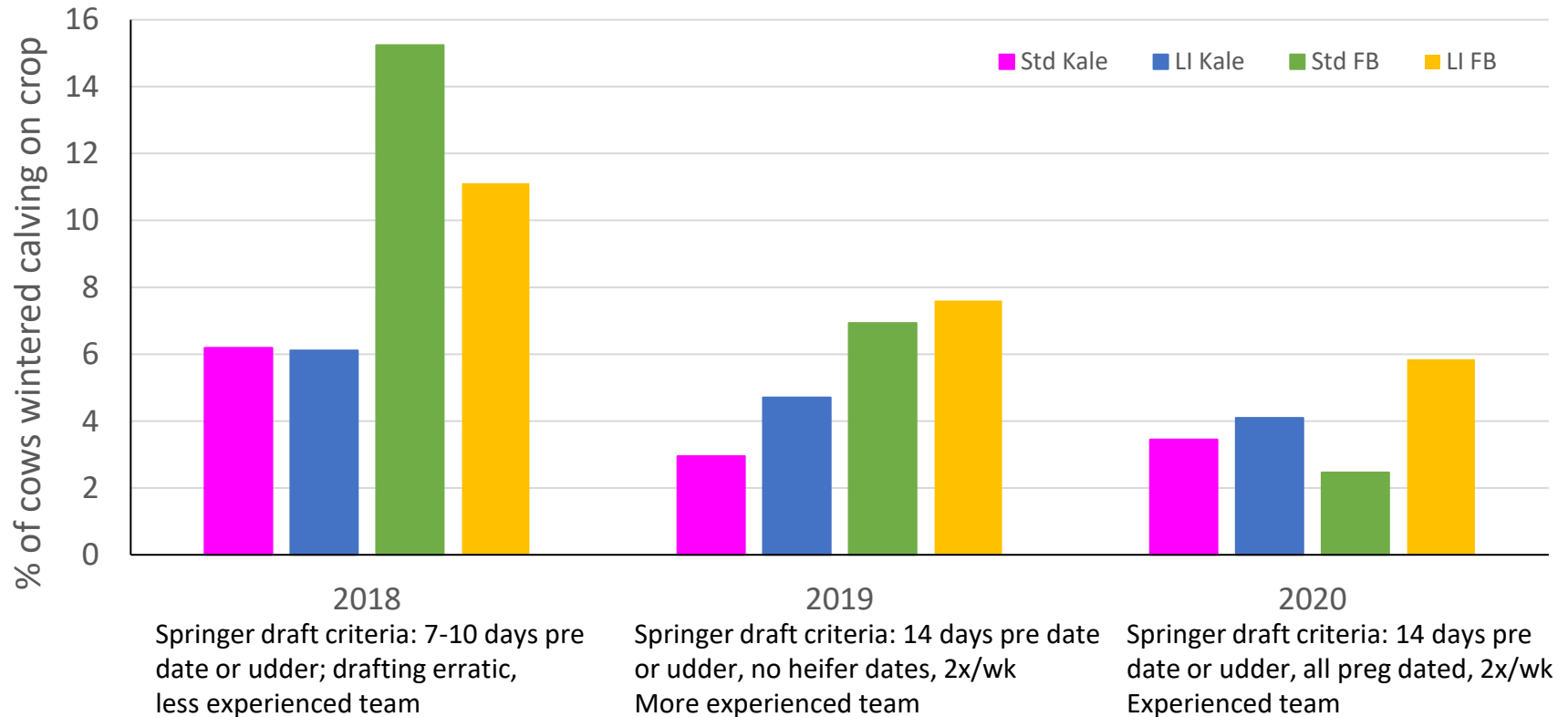
# Indicators for implementing “Plan B”

- Amount and number of consecutive days of rain - > 2 days cows will be getting tired
- Proportion of the paddock with water pooling
  - >17% of available area  herd average lying less than 10 hrs/day
  - >80% of available area  herd average lying less than 8 hrs/day

# Achieving proposed EFW pugging rules will be challenging



# Difficult to avoid any cows calving on crop – implications for springer management





# Conclusions:



Cow lying needs were met on most days, with herd averages above 8 h/day



Mob structure and daily management will be key to ensure every animal is fit for winter



Public perception and environmental risk are still strong drivers regardless of the animal's needs being met



An uncomfortable lying surface is consistent with a “sodden” gumboot score and significant water pooling



We cannot control the weather so a risk-based approach to wintering is required. We now have practical indicators for implementing contingency plans

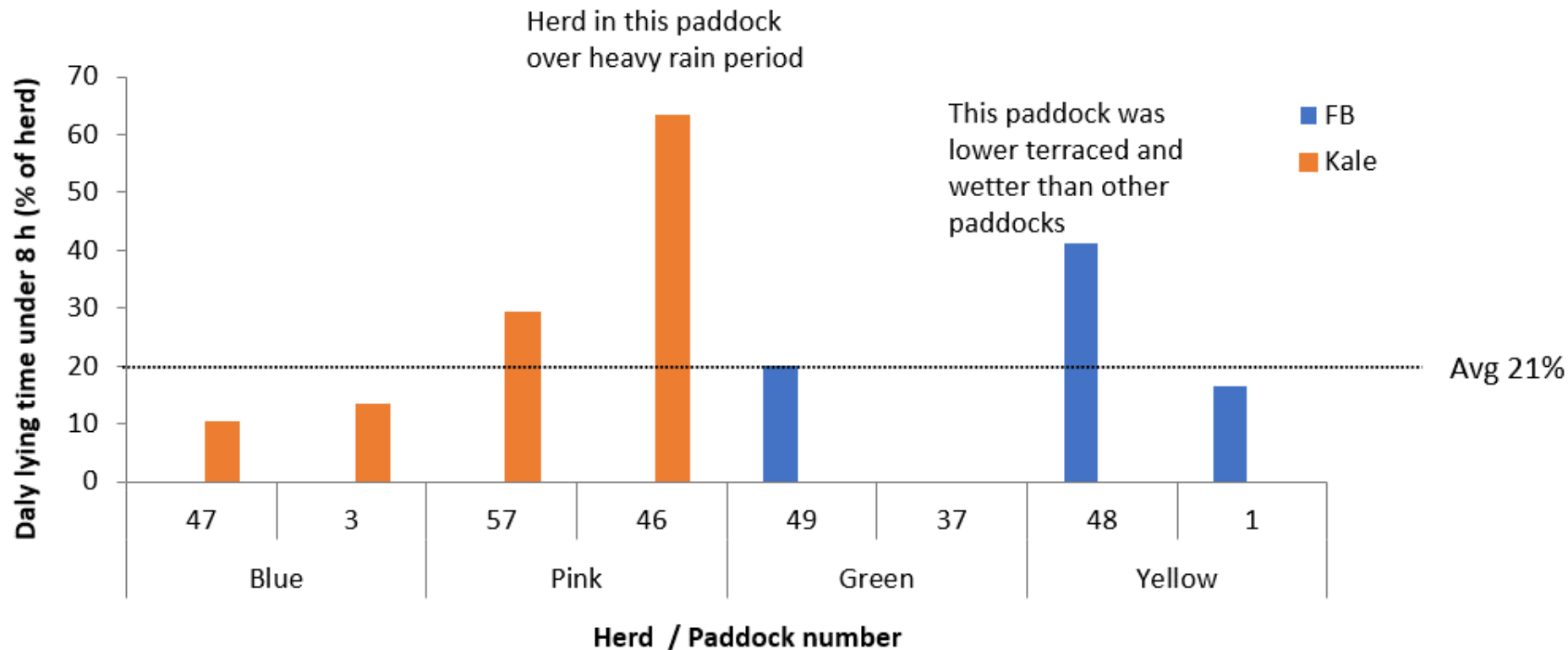


Executing a contingency plan multiple times during winter is not a sustainable future, requiring investigation into alternative options e.g. cost effective infrastructure

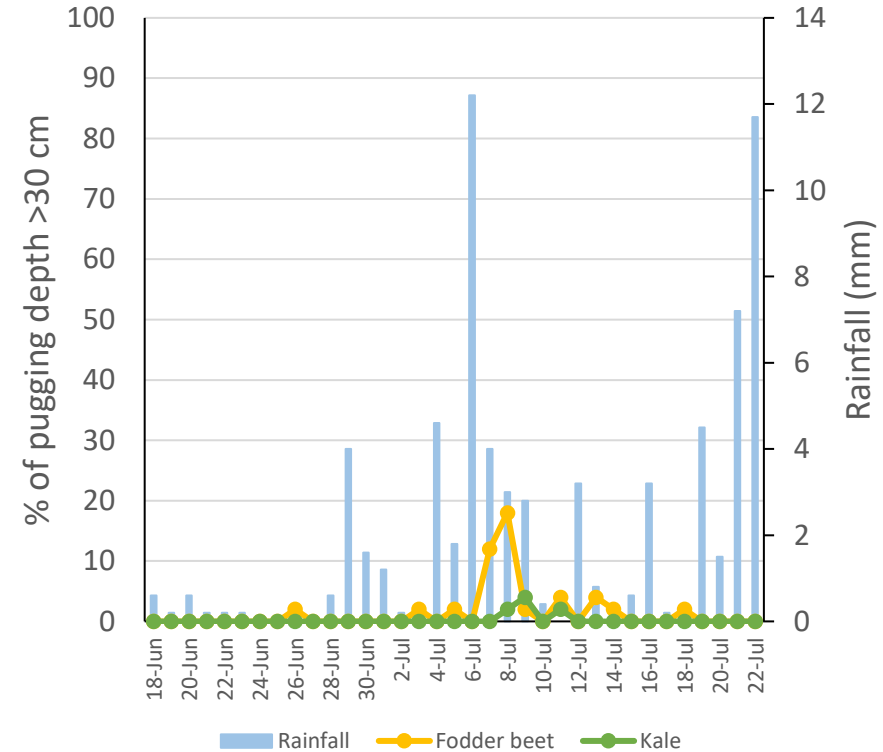
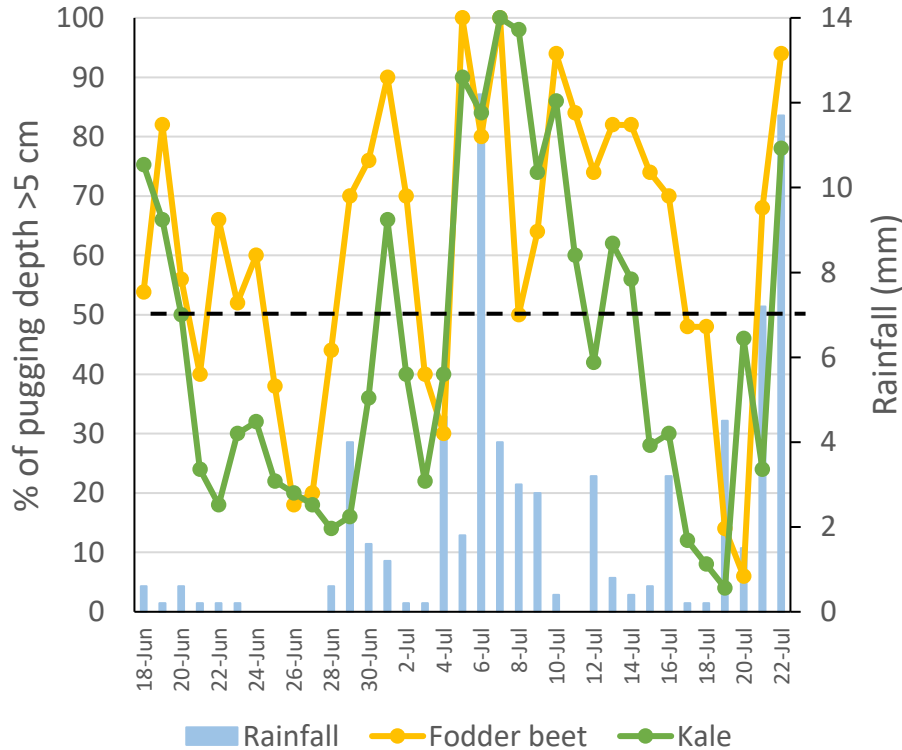
Thank you 😊

*DairyNZ* 

# Paddock rather than crop type had more affect on lying time

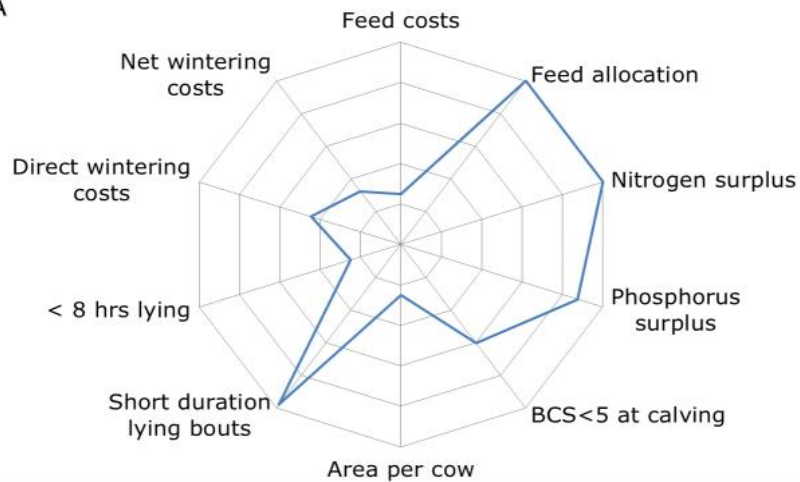


# Achieving EFW pugging rules will be challenging



# SWS: managing the risk of system trade-offs

Farm A



Farm B

