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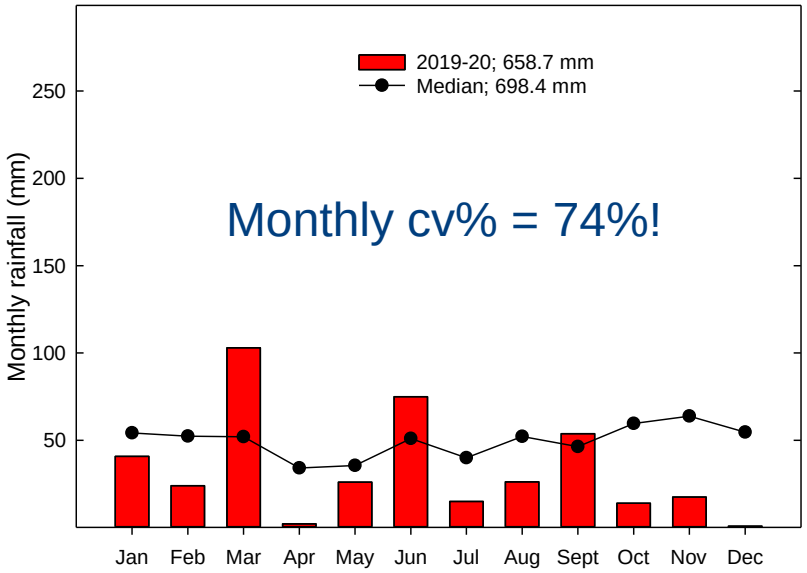
Managing the dry times

Perennial pastures and pasture rennovation

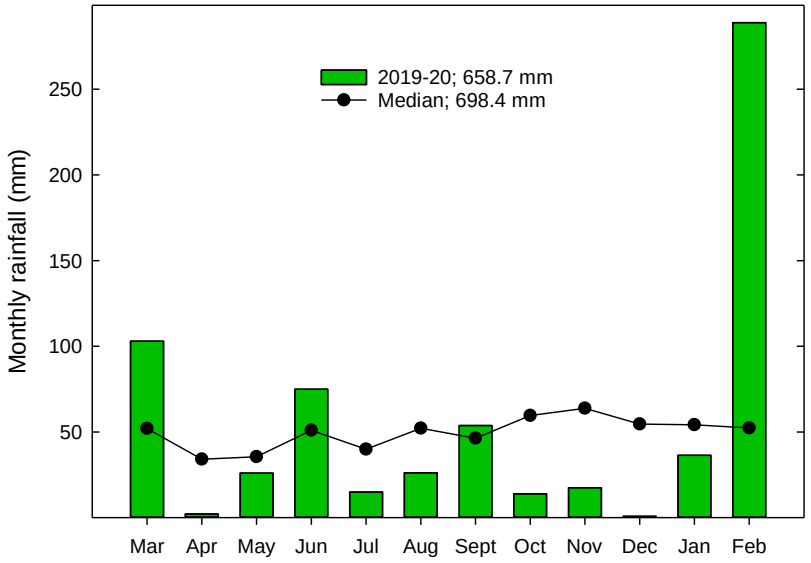
Richard Hayes, 13 March 2020

Managing dry times??

Monthly rainfall received at "Hillwood", Middle Arm in 2019



Monthly rainfall received at "Hillwood", Middle Arm in the previous 12 months



OBJECTIVE: Survive the dry times and utilise the wet times

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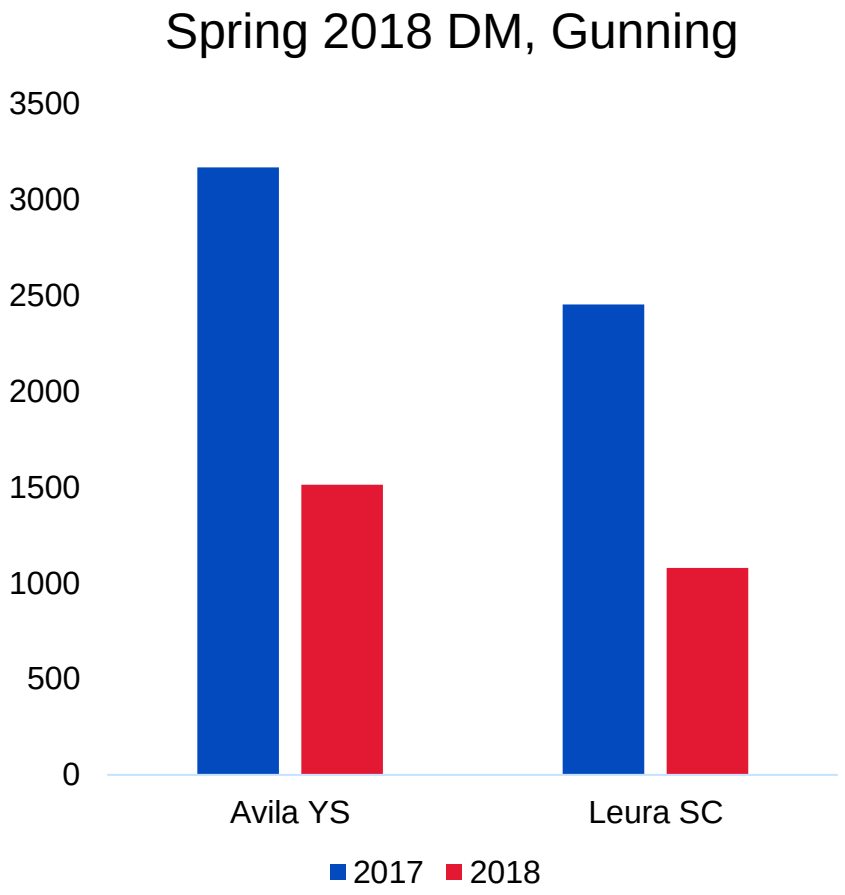
Why perennial-based pastures?

1. Plants are in place when resources become available
2. ↑ utilisation of resources

Value of plants being in place….



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JOHN SHEARER
Tyne Drill

Resource-use efficiency of perennial-based pasture

Perennial pasture

- Deeper roots
  - 2+ years
- Year-round growing season
- Infrequent disturbance
- Mixed sward
  - legumes
- Spread beyond drill rows
- Moderate-complex interactions b/n organisms
- Improved environmental outcomes
  - SOM, salinity, leachates

Annual crop

- Shallower roots
  - <1 year
- Winter-spring growing season
- Annual disturbance
- Monoculture
  - Synthetic N
- Confined to drill rows
- Few interactions
  - More vulnerable to pests
- Risks environmental degradation

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Components of long-term perennial-based pasture

- Perennial grasses
  - C3
  - C4
- Perennial legumes?
- Perennial herbs?
- Annual species
  - Self-regenerating legumes

Self-regenerating annuals…

… Helping to manage finite resources in a perennial-based sward

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Species options

- “We don’t have many options”
- Think about:
  - Pasture longevity
  - Primary feed gaps
  - Enterprise
  - Soil types

Viable options…

- Phalaris 
- Cocksfoot 
- Tall fescue ???
- Tall wheatgrass ???
- Perennial ryegrass 
- Perennial bromes
- Tropical grasses 
  - Rhodes grass, Digit grass, Panic etc
- Native grasses 
- Other??

- Lucerne 
- White clover ???
- Other perennial legumes 
- Chicory ???
- Plantain???
- Subclover 
- Serradella ???
- Other?

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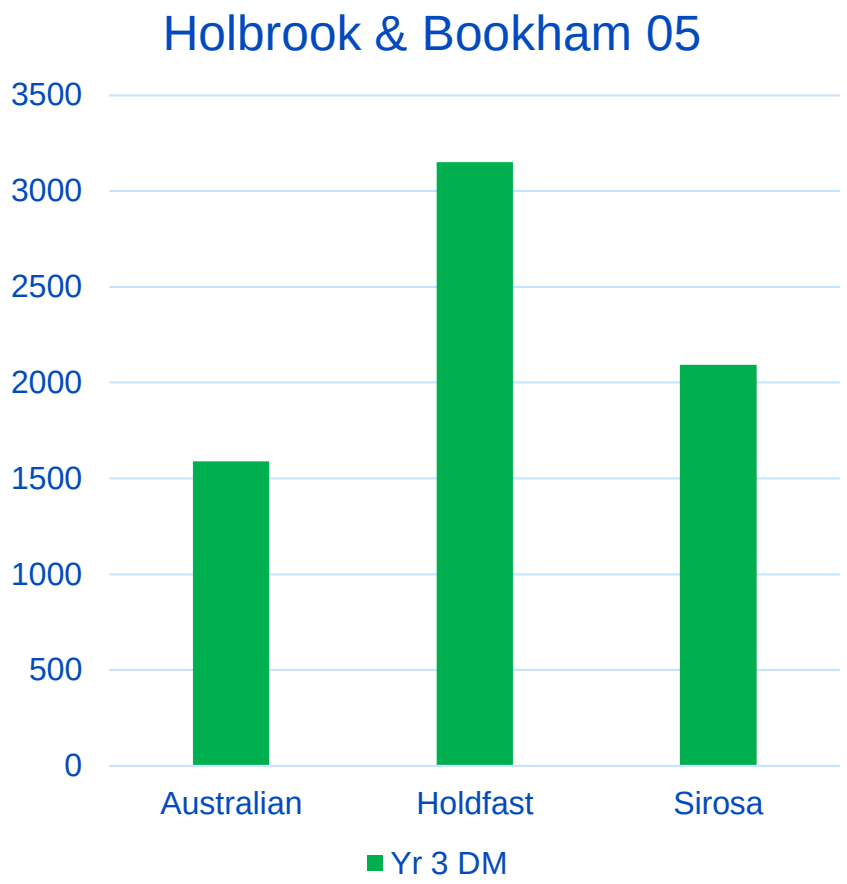
Phalaris

- Selected cultivars trialled at Bookham & Holbrook 2005-08
- Cv. Australian sig. less productive
- Other cultivars to consider include Landmaster, Holdfast GT, Advance AT



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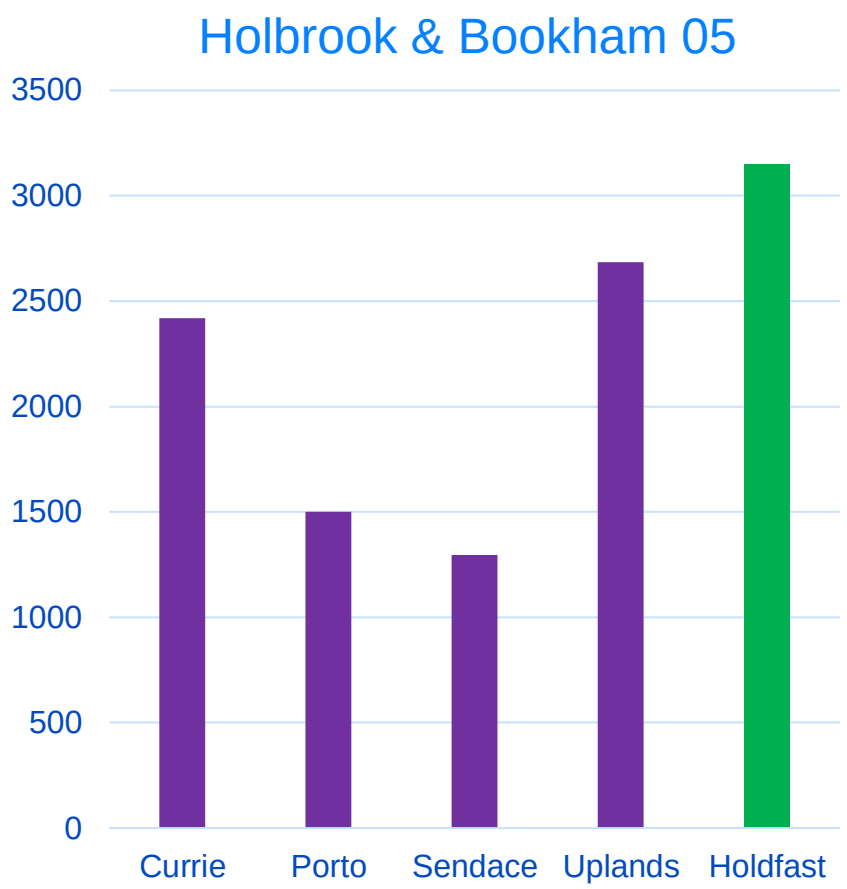
Cocksfoot

- Good for shallow soils
- Three dormancy types:
- Summer active
  - Porto
- Summer dormant (Hispanic)
  - Sendace, Uplands
- Intermediate
  - Currie



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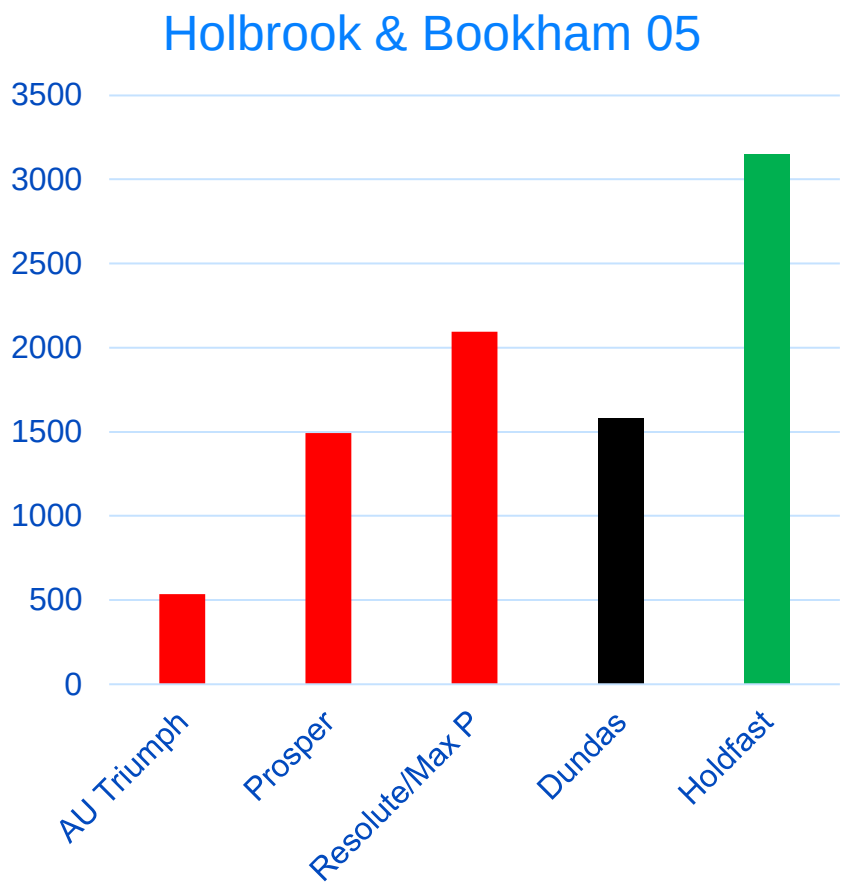
Tall fescue & wheatgrass

- Significantly less productive than phalaris
  - See Hayes et al. 2012
- Generally only for super-wet soils
- TW for saline soils



Annual legumes: Subclover and serradella

Cultivar evaluation, 2017-present: Bigga, Goulburn, Yass, Bombala, Gunning

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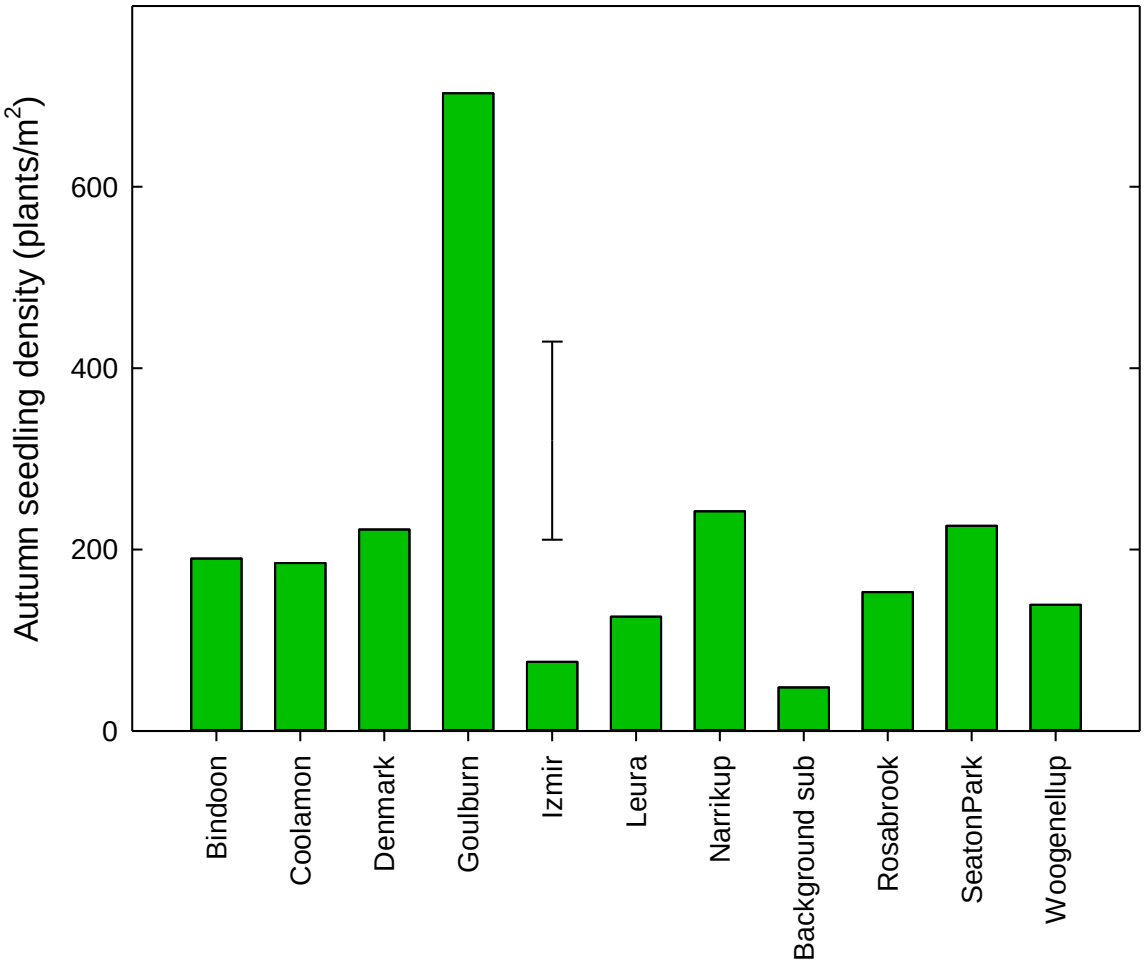
Subclover cultivars

Yr 3 seedling regeneration at Bombala, Goulburn and Bigga



Cultivar	Initial Hard seed	Rate of hard seed breakdown	Residual hard seed	Av. days to first flower	Flowering time instability	Seed production	Seed size
Subterranean clover							
Goulburn	1.00	1.00	1.00	1.00	1.00	1.00	1.00
French serradella							
Erica	1.00	0.28	5.92	0.89	4.15	75.5	0.41
Eliza	0.00	-	-	0.78	7.08	12.9	0.46
Margurita	0.90	0.33	4.80	0.83	5.62	29.8	0.35
1505-1C	0.31	0.07	2.14	0.85	2.62	22.8	-
Cadiz	0.00	-	-	0.81	5.81	8.1	1.07
Serratas	0.01	0.01	0.00	1.04	2.73	18.5	0.59
Yellow serradella							
Avila	1.10	0.22	7.04	1.00	1.75	143.5	0.57
Charano	-	-	-	-	-	48.7	0.72
King	1.10	0.41	6.02	0.73	1.38	190.6	0.67
Santorini	1.09	0.07	7.99	0.76	2.35	64.3	0.61
Yellotas	1.01	0.99	1.31	0.96	2.04	42.3	0.59

Footnote:
"*Serradellas for new environments*"

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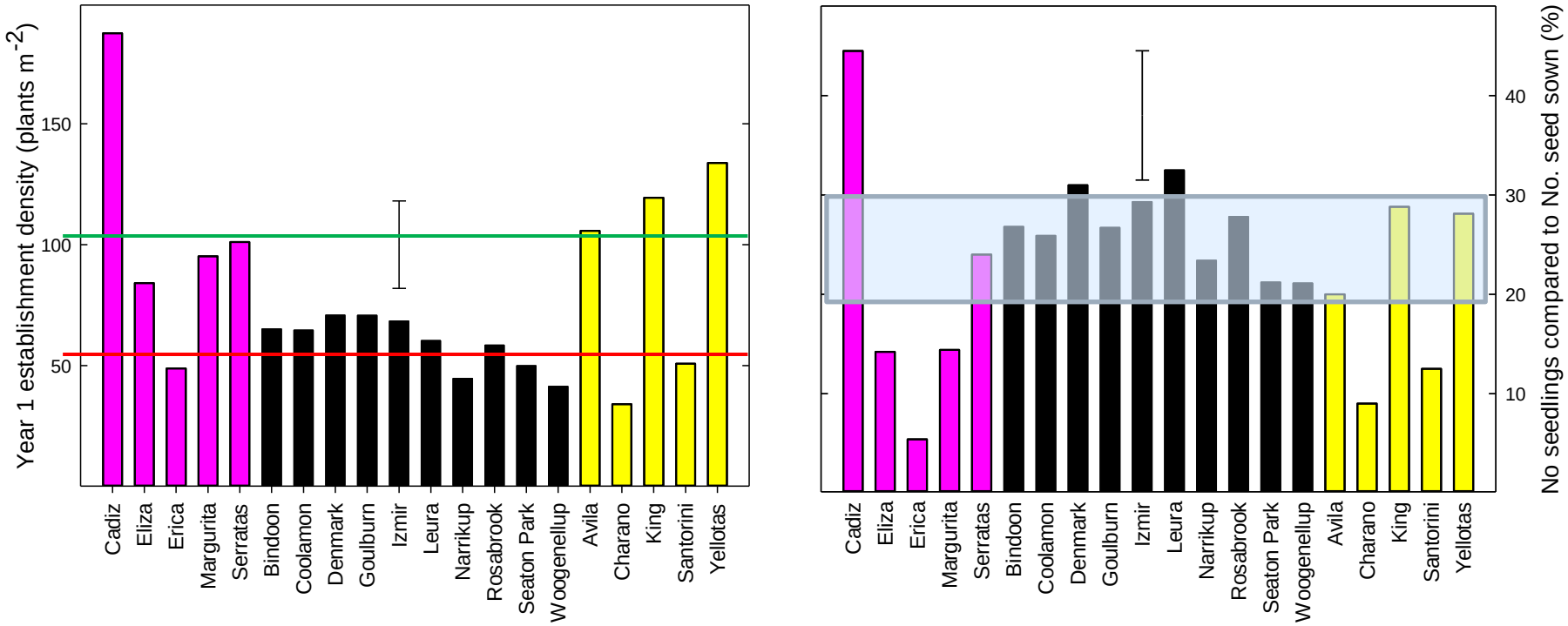
Improved establishment with serradella?



Serradella seed approx. 50% of sub clover by weight

Strike rate across all cultivars of only 20-30%

Lower strike rate on older seed, despite initial germ tests

LESSON: Sowing is a numbers game!

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Pre-coated pasture seed

- Bare phalaris: 153 seeds = 0.26g
  - 1000 sw = 1.70g
- Coated phalaris: 166 seeds = 1.02g
  - 1000 sw = 6.14g
- Coated seed was 3.6 times heavier than bare seed
- 1.5 kg sowing rate need to increase to 5.4 kg/ha
- Actual sowing rate reduced to 0.42 kg/ha

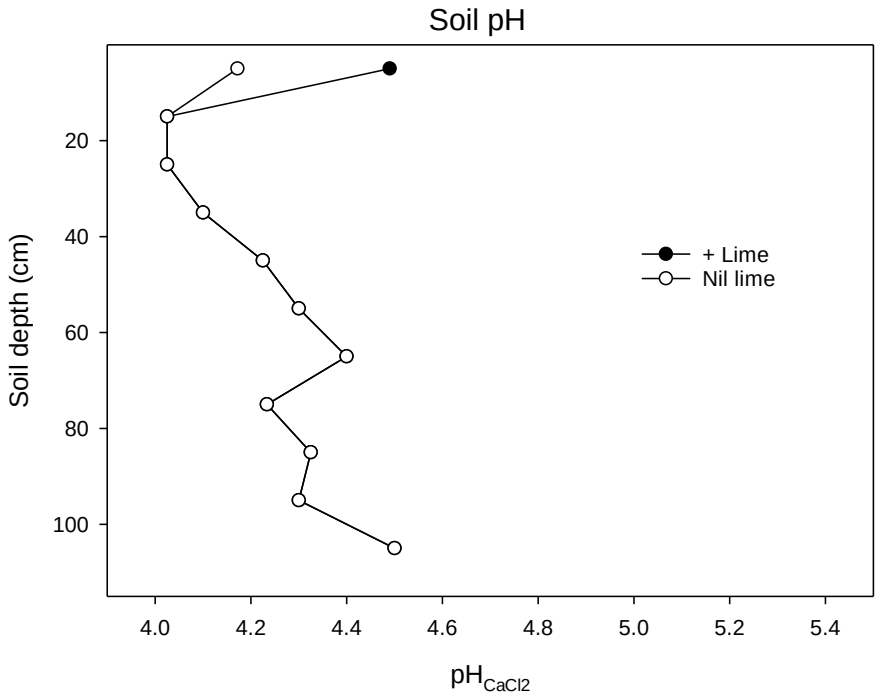
Pre-coated pasture seed

- Assuming all components of the mix had the same coating with the same target seeding density:
  - Seed costs would increase from $121/ha to $436/ha
- Lime (5t/ha) was purchased prior to sowing @ $53/t landed
  - Lime on the seed coat was ≈ $15 000/t

Pre-coated pasture seed

- Adds to then unit cost of seed
  - Content of coat often unknown
- Very short shelf life (6 weeks for subclover)
- Survival of N-fixing bacteria variable and often poor
- Lack of information about other components of seed coats (eg fungicides/insecticides)
- Lack of data supporting the use of seed coats

Lime – Check your rate



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Summary

- Good perennial-based pastures are an efficient feed source for livestock
- Few viable options for long-term pastures
- Select spp. & cvv. that are fit for purpose based on **evidence** of their adaptation to your environment
- Sowing is a numbers game
  - Avoid pre-coated seed
- Apply adequate lime and fertiliser to hit your target

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#P4Pastures

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