RED MEAT UPDATES

TASMANIA

28 July 2023

Serradellas for new environments

Rowan Smith
Tasmanian Institute of Agriculture

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Serradellas for new environments

Rowan Smith, Rebecca Haling and Richard Hayes

Red Meat Updates July 2023

https://www.utas.edu.au/tia/research/research-projects/projects/serradellas-for-new-environments

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What is serradella?

1

Annual pasture legume

Yellow serradella - *Ornithopus compressus*
French (pink) serradella - *Ornithopus sativus*
Other species

2

Origin

Native of the Mediterranean region, and central and north-western Europe

3

Used extensively in WA

Performing well on sandy acidic soils in rotation with cereal crops

4

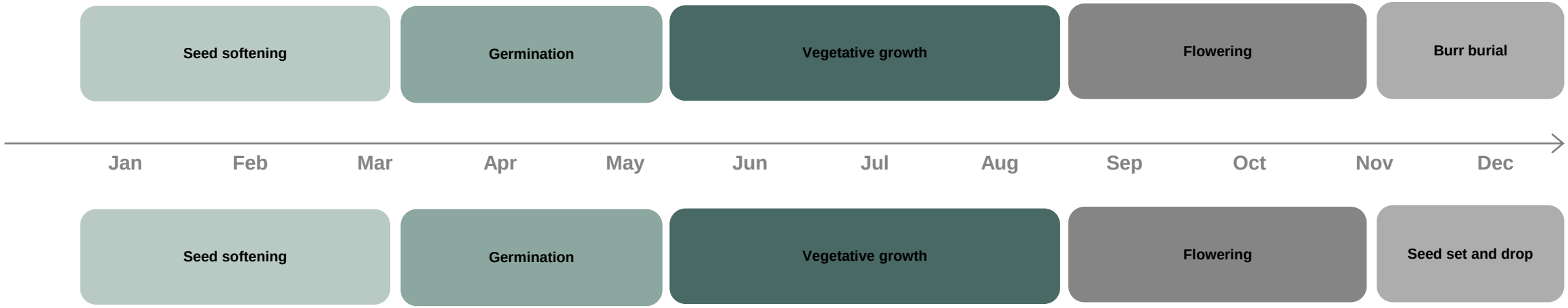
Does it have a fit in Tasmania?

This project seeks to identify cultivars and develop agronomy packages for the permanent pasture zone of south-eastern Australia





Subterranean clover



Serradella





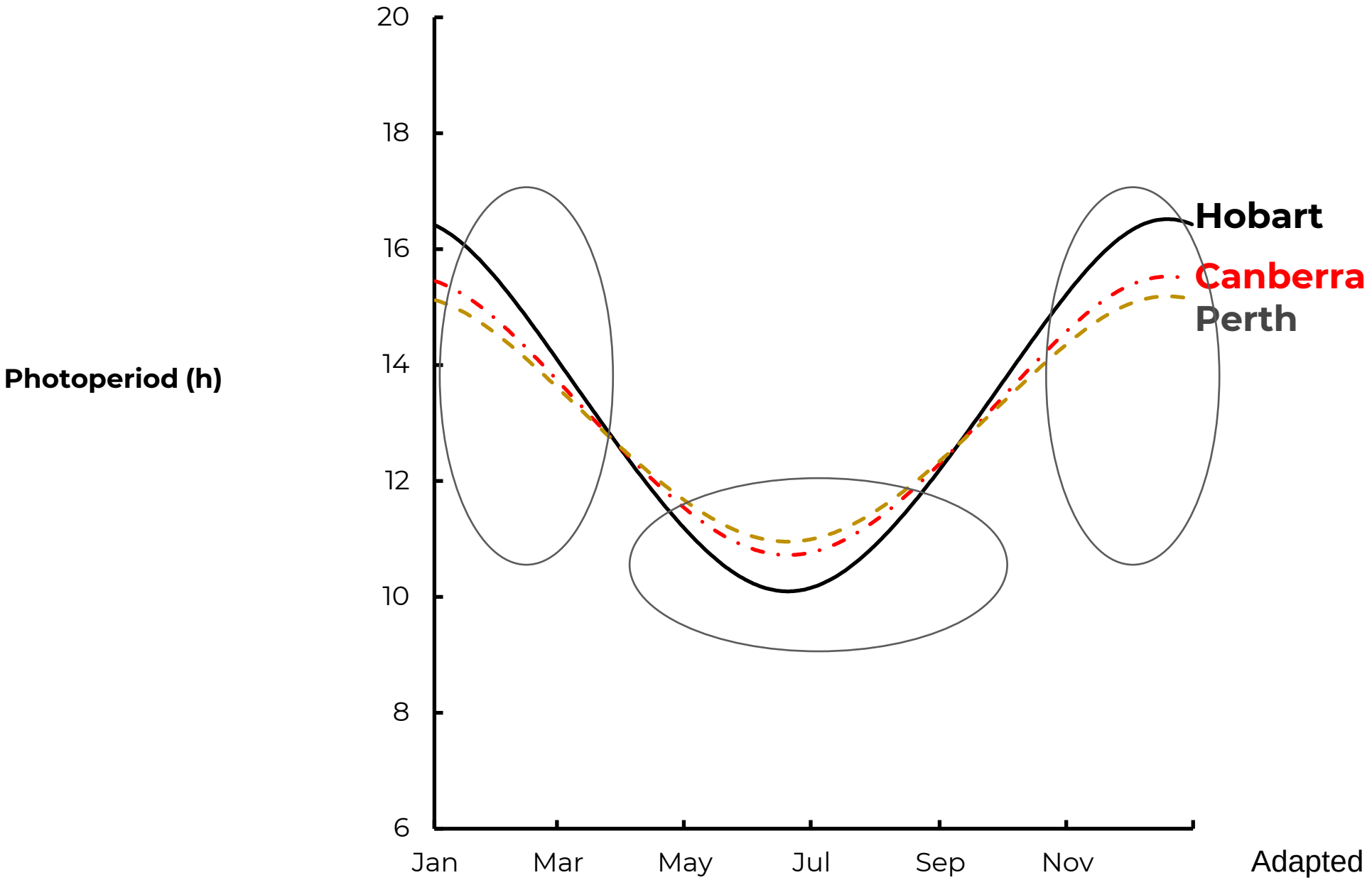
Some sub clover photos from: How do I optimise sub-clover based-pastures? - The Toolbox - MLA eLearning

Flowering experiments

What controls flowering in serradella?

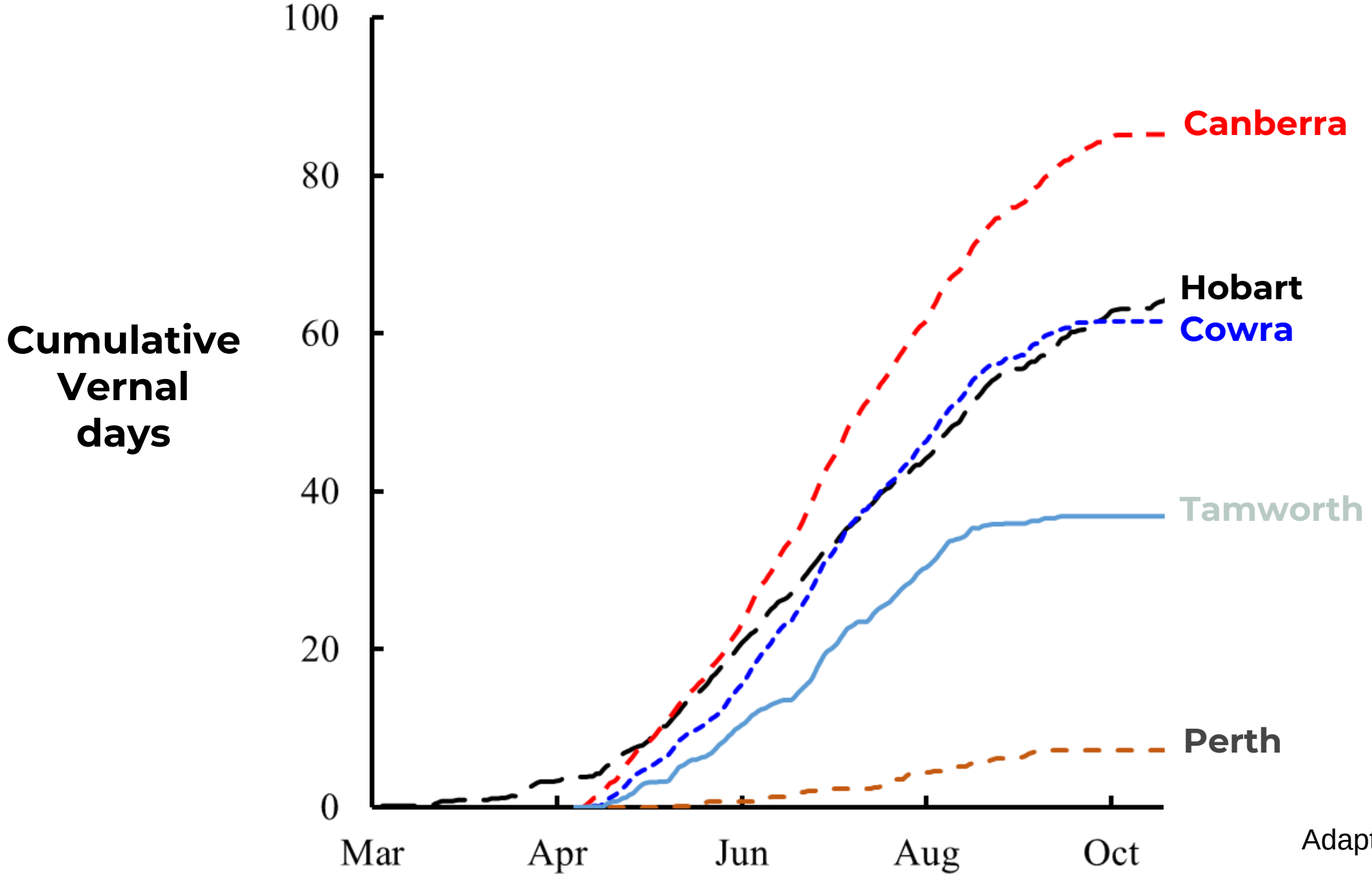
- Daylength
- Vernalisation

Photoperiod: southern Australia



Adapted from Goward (2023)

Vernalisation conditions: variable across southern Australia



Adapted from Goward (2023)

Flowering experiments

Why is flowering (maturity) date important?
and why is flowering stability important?

- Dry matter production
- Feed quality
- Persistence
  - flower after major frost risk
  - before soil moisture deficits
- Grazing management.

Flowering experiments

Glen Innes, Northern Tablelands

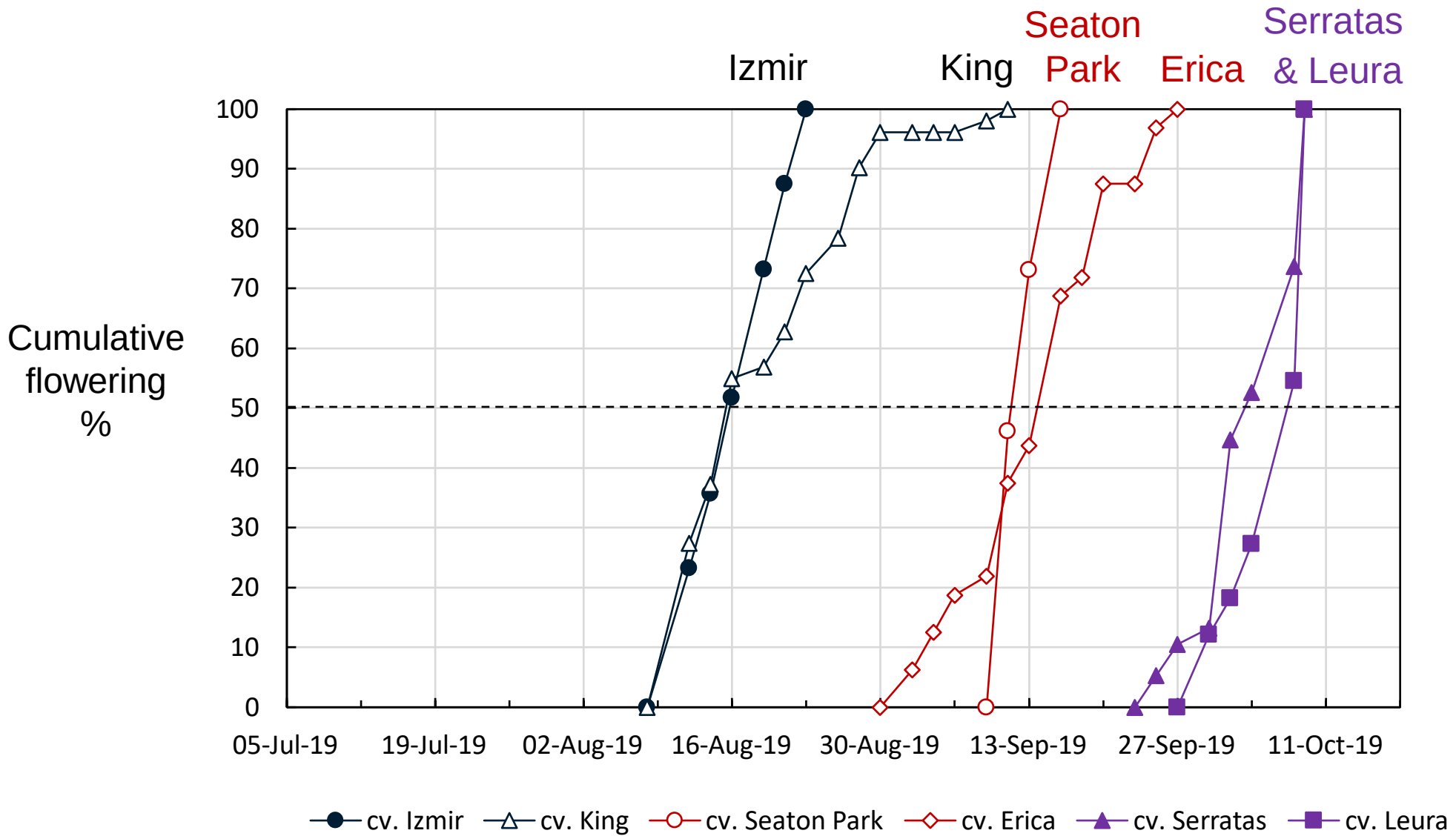
Black Mountain, Canberra

Bombala, Monaro

Mt. Pleasant, Launceston

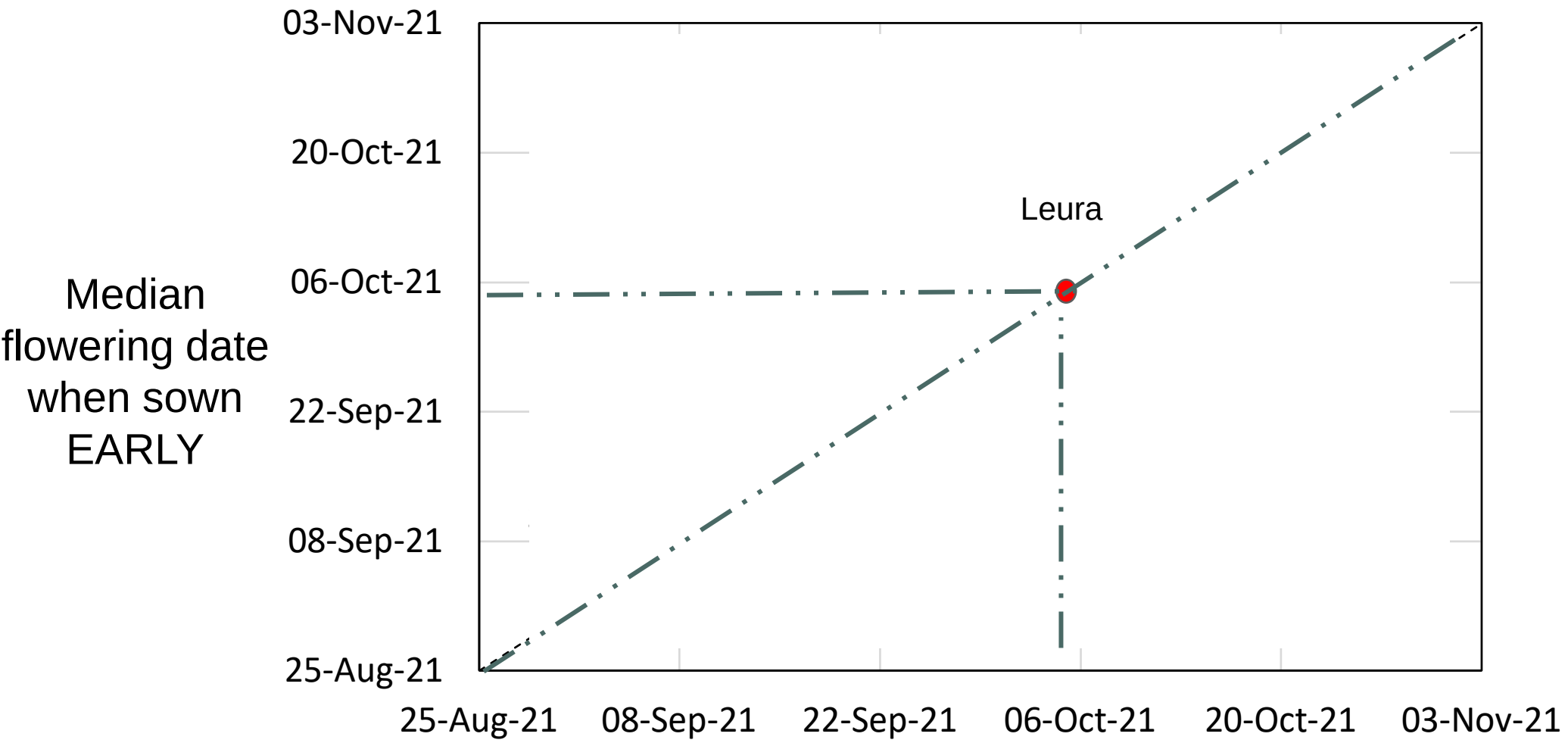
Early, mid and late flowering cultivars

Sown in mid-March in Canberra



Adapted from Haling *et al*. (2023)

Flowering date stability



Adapted from Haling *et al*. (2023)

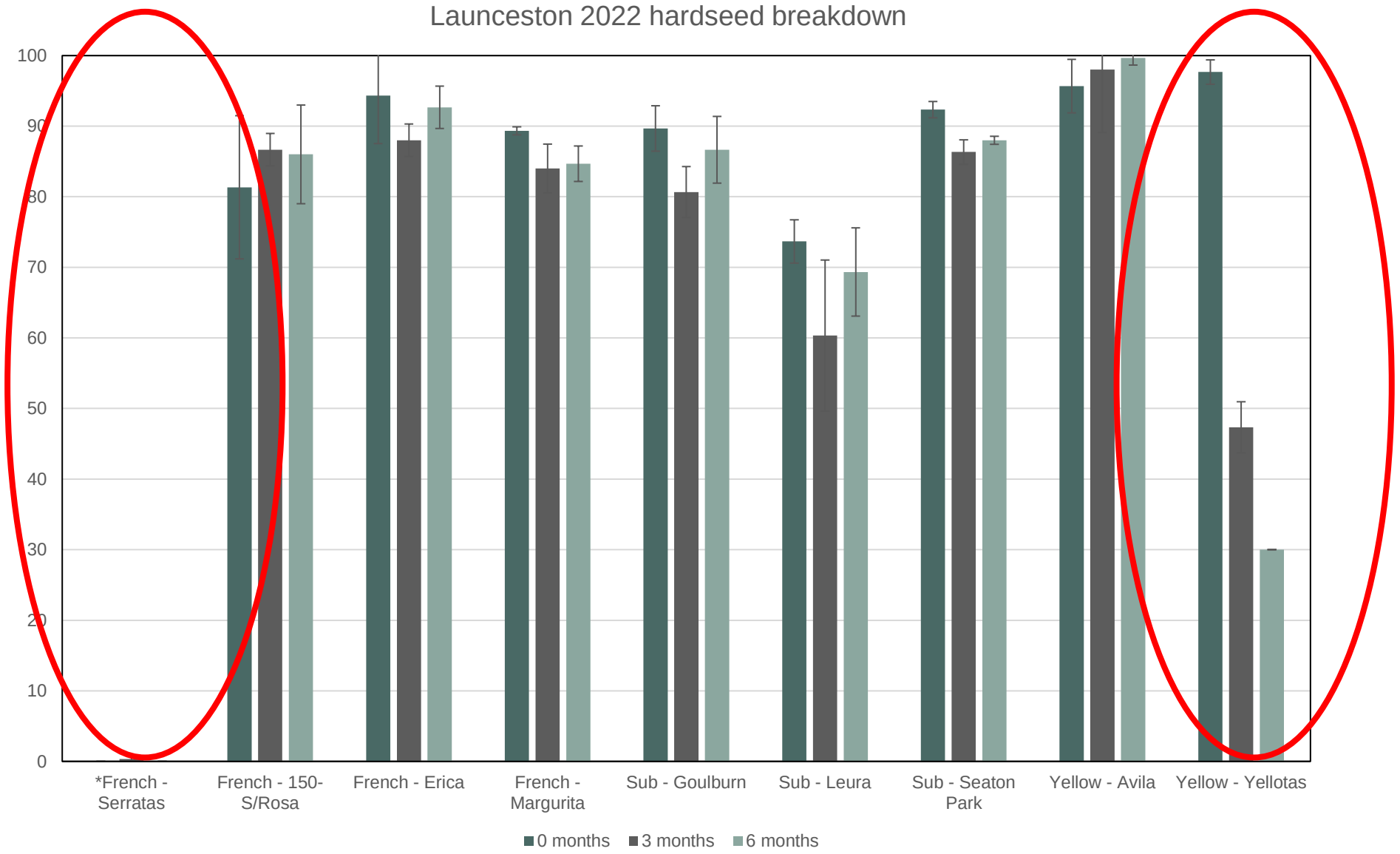
Hardseed breakdown experiments

- What is hard seed?
  - dormancy mechanism
  - level of hard seed

- Why is the rate of breakdown important?

Hardseed breakdown experiments

Hardseed levels and breakdown patterns:



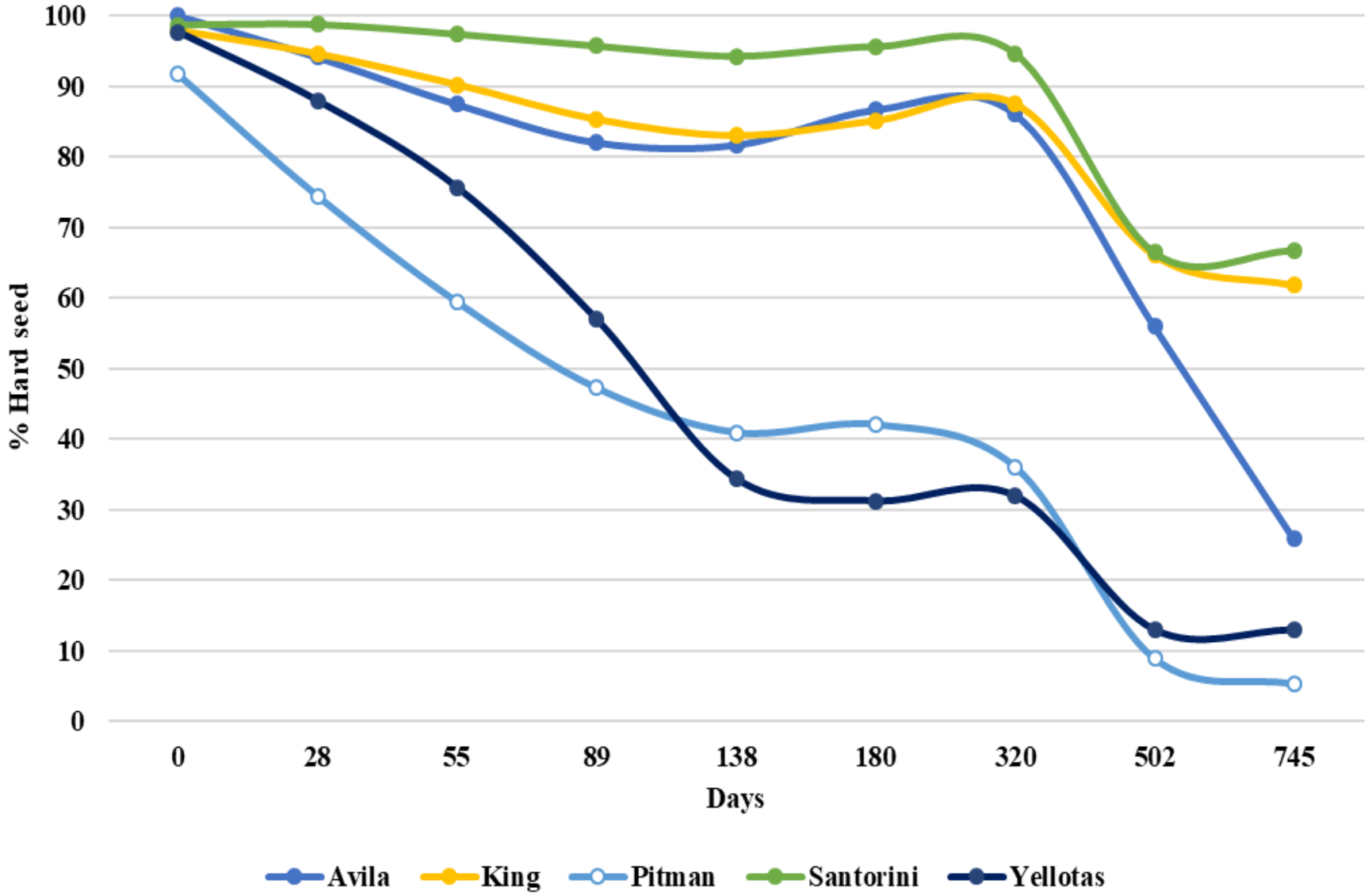


Figure 1: Mean of residual hard seed expressed as a percentage over time for yellow serradella

From Martin *et al*. (2023)

cv. Yellotas

- Yellotas (sometimes misspelt Yellowtas) was developed from an accession introduced to Australia in 1972; CPI 50484
- Yellotas was bred by Eric Hall and Andrea Hurst at the Tasmanian Institute of Agriculture during the early 2000s
- Selected for vigour, late flowering and high seed production
- Straight to slightly curved pods
- Has fast rate of hard seed breakdown
- Shows promise for persistence

Persistence experiments

- which cultivars will persist

Merton Vale, Apr 2023

Merton Vale, May 20

Merton Vale, May 2022

Demonstrations

Merton Vale, May 2023

Flowering experiments

- matching cultivars to grow regions

Hardseed breakdown experiments

- understanding dormancy

Persistence experiments

- which cultivars will persist and where

Sowing rate experiments

- what are the optimum sowing rates

Agronomy package

Take home messages

- Choosing a cultivar that matches the environment and purpose is critical.
- Developing a seedbank in the first year/s is required for persistence in perennial pastures.
- There will be a field day this spring to come and have a look at the demonstration site.

Acknowledgments

Research teams

- CSIRO – Rebecca Haling, Richard Simpson, Laura Goward and Adam Stefanski
- TIA – Rowan Smith, Gary Martin, Jo Talbot
- NSW DPI – Richard Hayes, Matt Newell, Carol Harris

Funding from Meat & Livestock Australia

Further reading and information

Serradellas for new environments project page
https://www.utas.edu.au/tia/research/research-projects/projects/serradellas-for-new-environments

Goward Laura E., Haling Rebecca E., Smith Rowan W., Penrose Beth, Simpson Richard J. (2023) Flowering responses of serradella (Ornithopus spp.) and subterranean clover (Trifolium subterraneum L.) to vernalisation and photoperiod and their role in maturity type determination and flowering date stability. Crop & Pasture Science 74, 769-782.
https://doi.org/10.1071/CP22366

Haling Rebecca E., Goward Laura, Stefanski Adam, Simpson Richard J. (2023) Variation in flowering time and flowering date stability within a cultivar of French serradella. Crop & Pasture Science 74, 756-768.
https://doi.org/10.1071/CP22222

Newell Matthew T., Haling Rebecca E., Hayes Richard C., Stefanski Adam, Li Guangdi D., Simpson Richard J. (2023) Hard seed breakdown patterns of serradella (*Ornithopus* spp.) in two contrasting environments of south-eastern Australia. *Crop & Pasture Science* **74**, 700-711.
https://doi.org/10.1071/CP22199

Martin Gary, Smith Rowan W., Newell Matthew T., Haling, Rebecca E, and Hayes Richard C. (2023) Yellotas: A unique yellow serradella cultivar with potential for permanent pasture environments. Proceedings of the Pasture Legumes for Sustainable Productive Systems Symposium. Editor B. Cullen. Australian Grassland Association Research Series No 6, University of Western Australia (Australian Grassland Association) 35-39

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Thank you

Not the first time TIA has worked on serradella

Annual legume life cycle

Pods form and plants senesce

Annual plants avoid summer moisture stress

Seed germinates in autumn and vegetative growth through spring

Plants begin to flower when risk of frost is low and before terminal drought

Plants extend from rosettes to secondary and tertiary stems

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