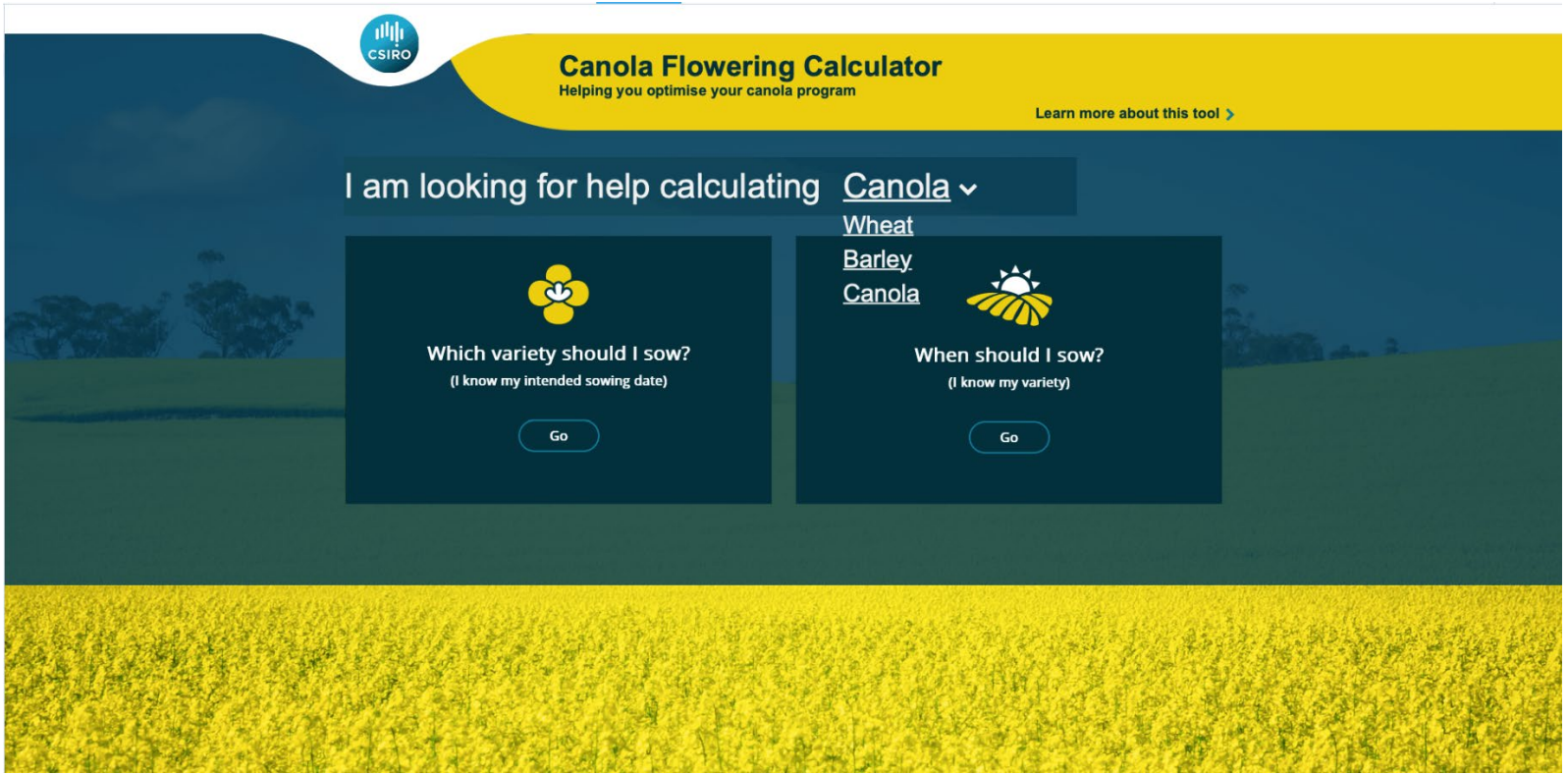
NATIONAL PHENOLOGY INITIATIVE PHASE 2– NEXT-GEN FLOWERING CALCULATORS (CSP2206-012RTX),

JEREMY WHISH, JULIANNE LILLEY, CSIRO AGRICULTURE AND FOOD

CROP FLOWERING PREDICTOR

National Phenology Initiative Phase 2– Next-Gen Flowering Calculators (CSP2206-012RTX),



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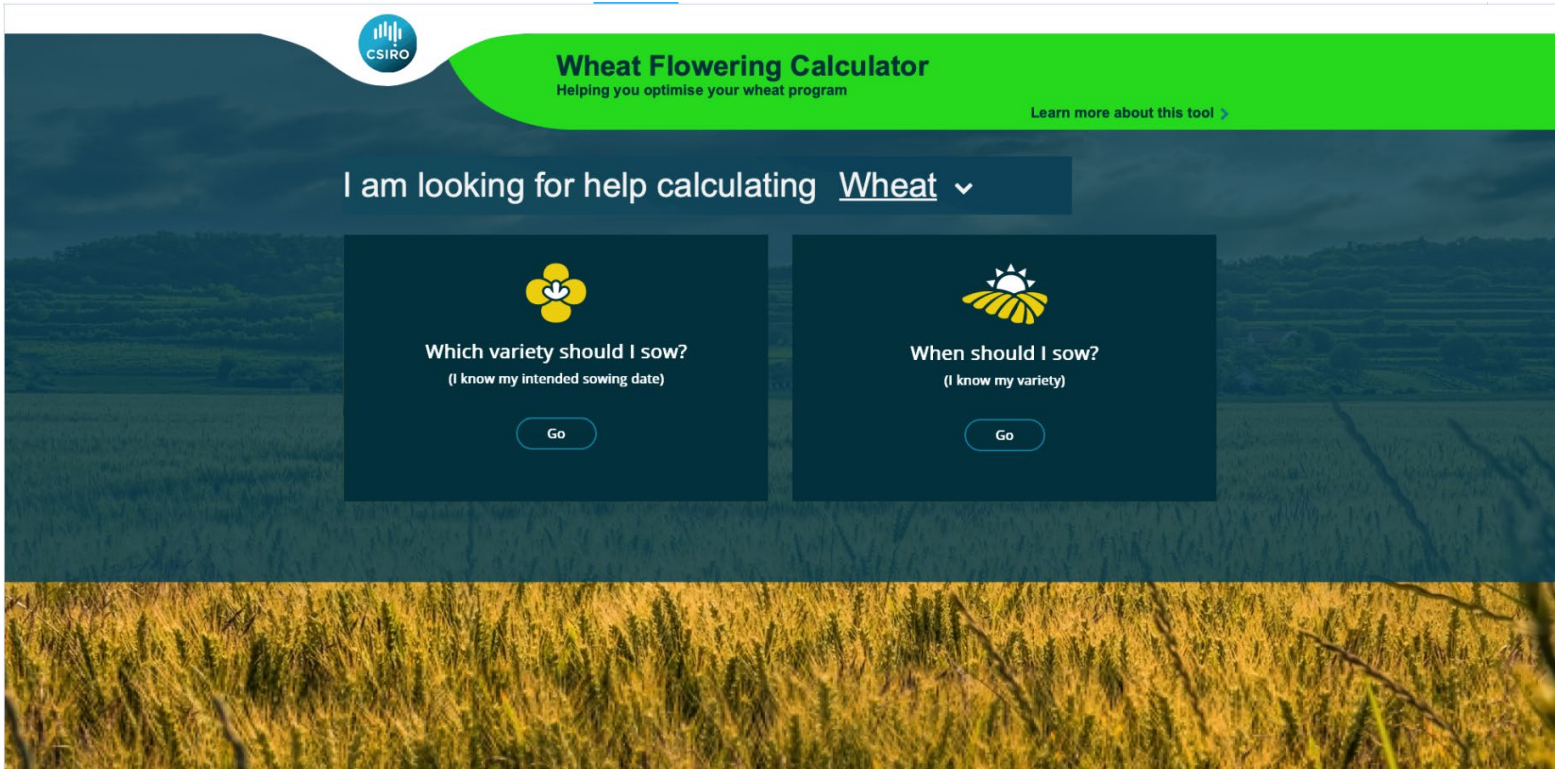
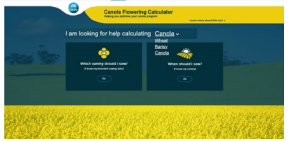


A BRIEF HISTORY

2015

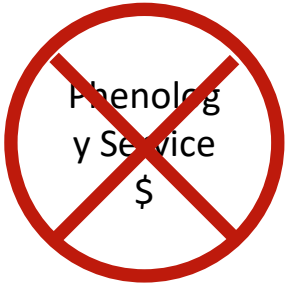
OCP

2017



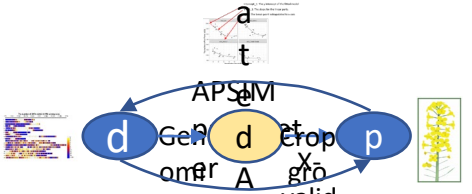
Calculator

2019



Phenology Service

2022



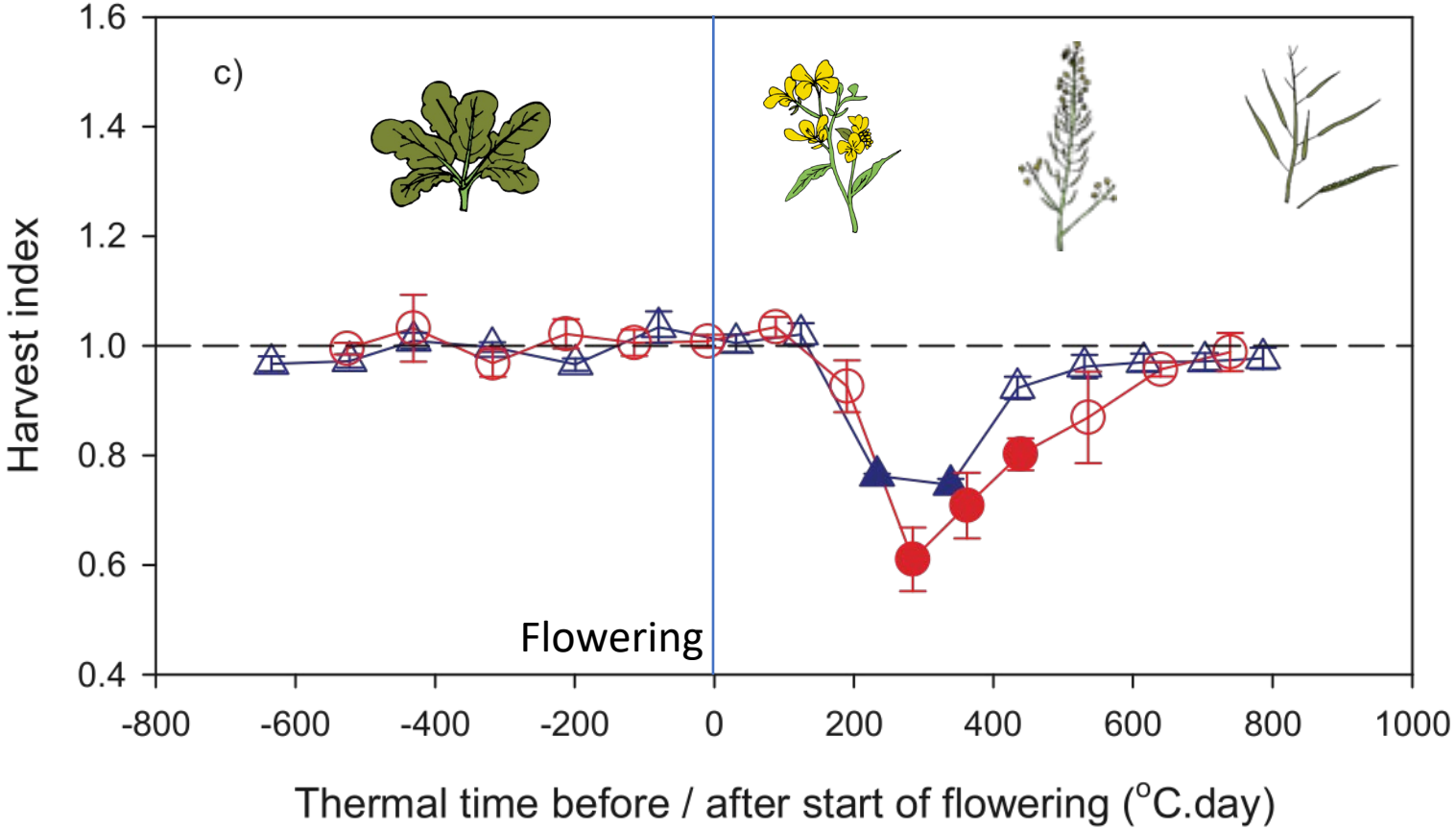
Omics Project

2023

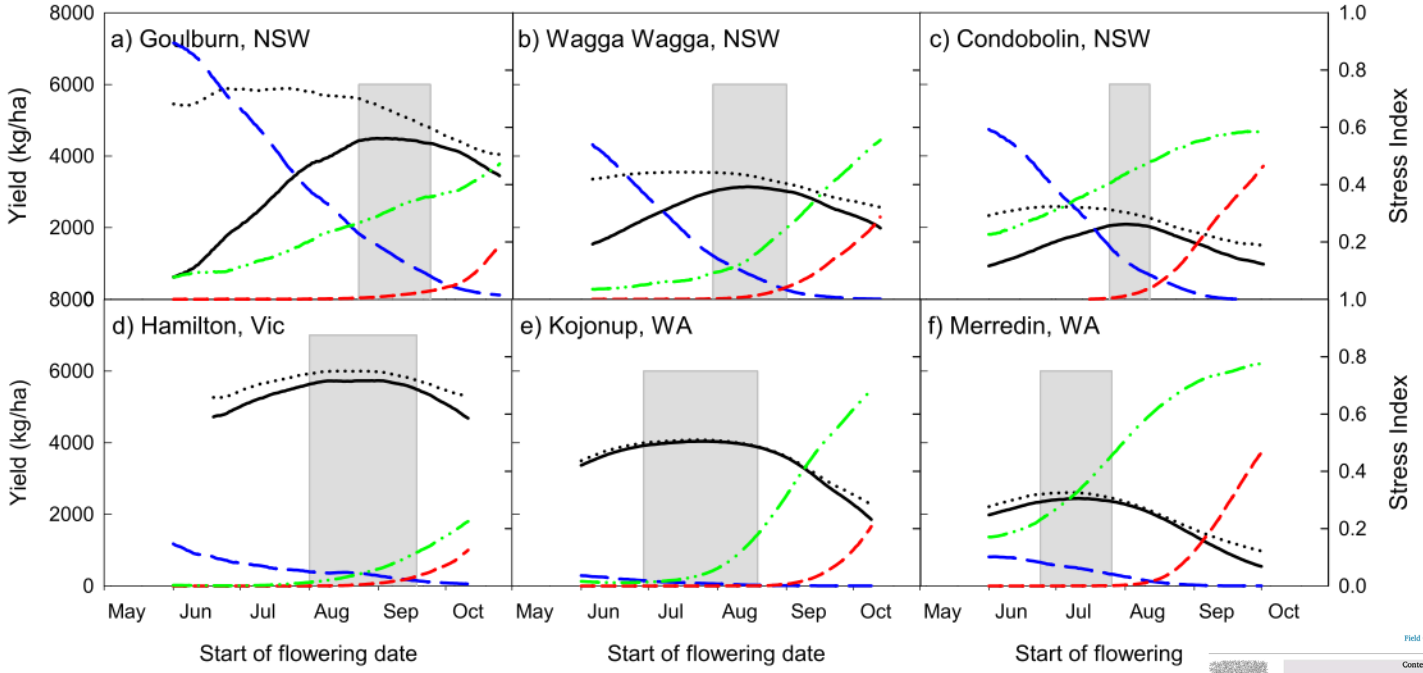
?

Now

OCP PROJECT CRITICAL PERIOD OF YIELD FORMATION?



OCP PROJECT OPTIMAL TIME TO START FLOWERING ?



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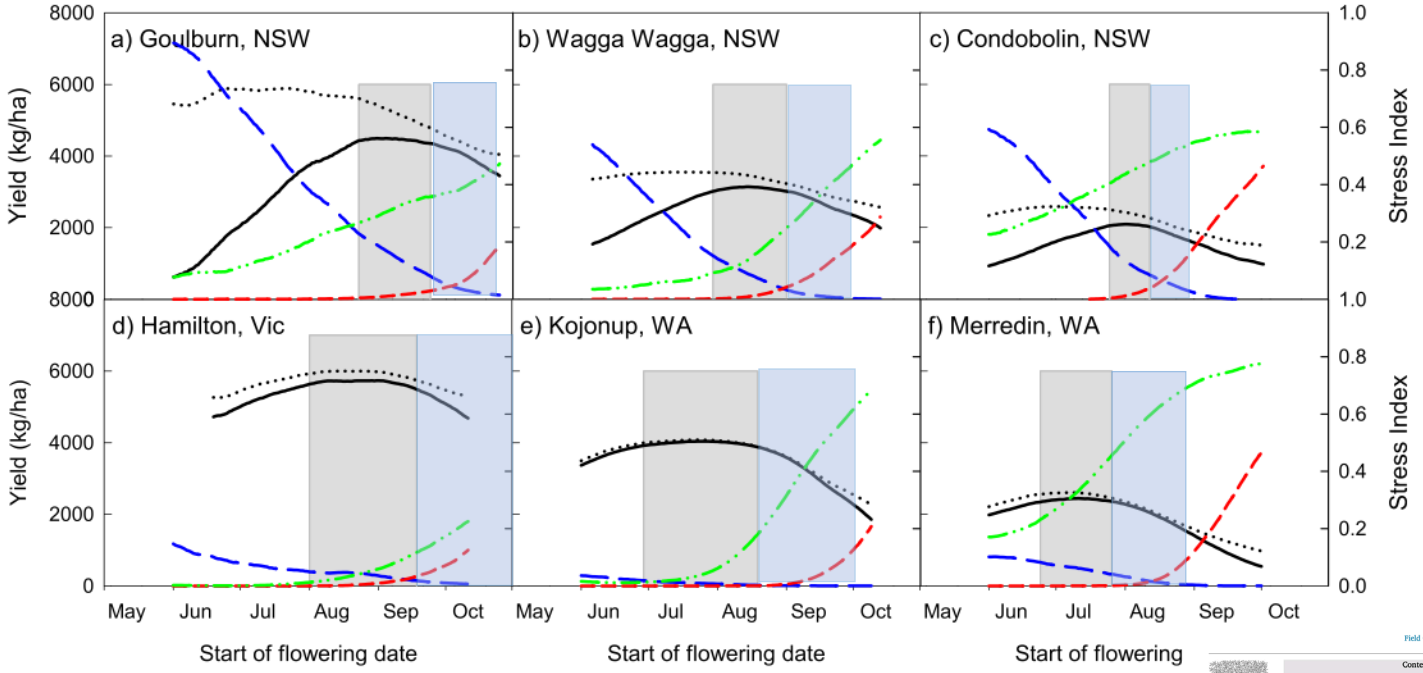
HOW DO YOU REDUCE STRESS DURING THE CRITICAL PERIOD?



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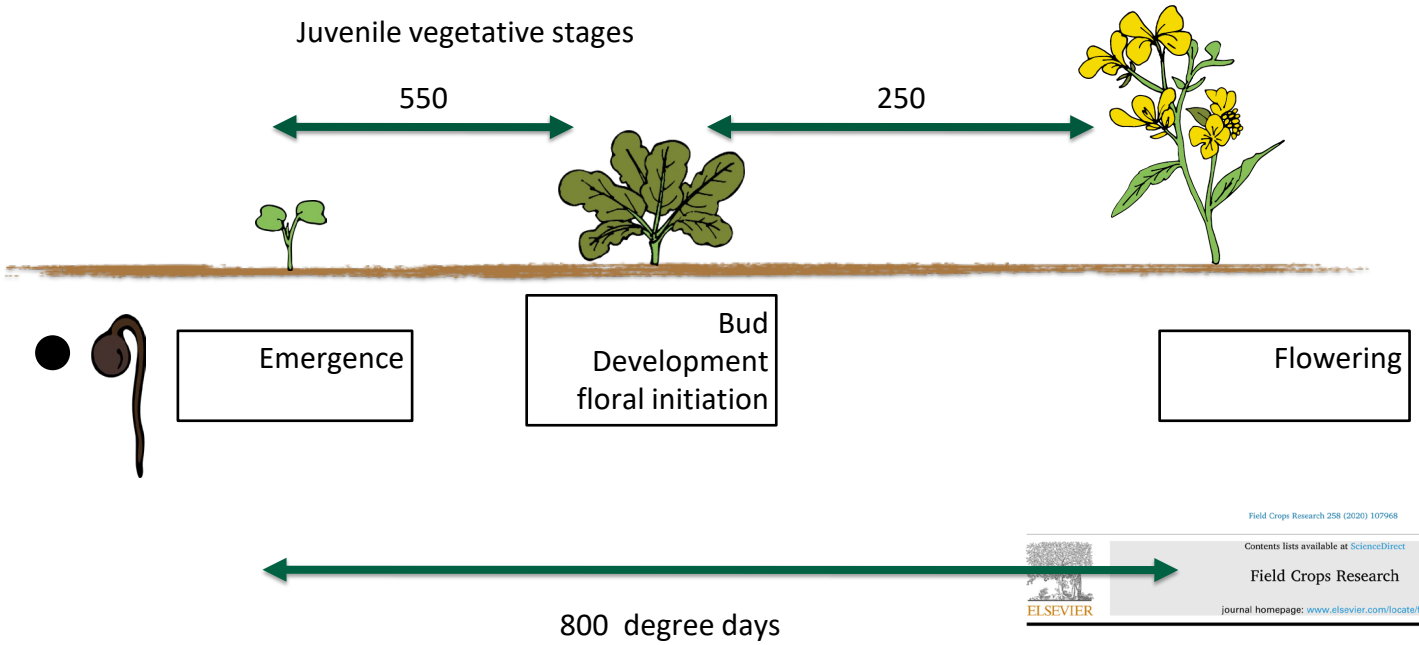
OCP PHENOLOGY OF AUSTRALIAN CANOLA



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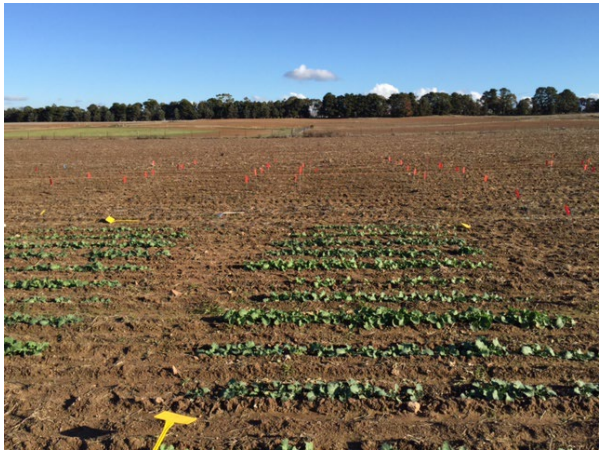
Vernalisation in Australian spring canola explains variable flowering responses

J.P.M. Whish [a,*], J.M. Lilley [b], M.J. Morrison [c], B. Cocks [d], M. Bullock [b]

[a] CSIRO Agriculture and Food, St Lucia, Qld 4067, Australia
[b] CSIRO Agriculture and Food, Canberra, ACT 2601, Australia
[c] Agriculture and Agri-Food Canada, Central Experimental Farm, 960 Carling Avenue, Ottawa, ON K1A 0C6, Canada
[d] CSIRO Agriculture and Food, Toowoomba, Qld 4350, Australia

CALCULATING PHENOLOGY

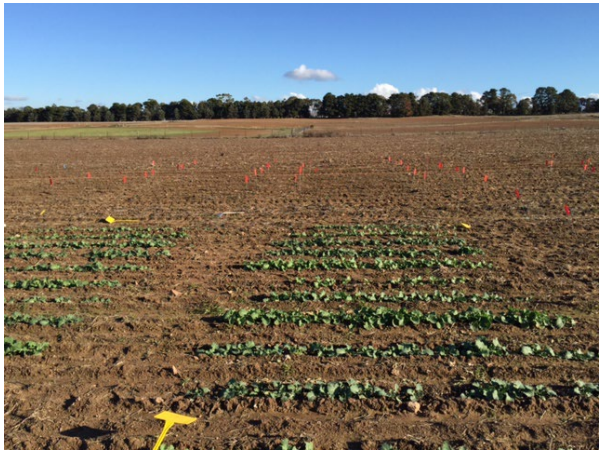


Sown on the same day, photos taken on the same day, same cultivars three different environments

CAN'T WE JUST USE DAYS FROM SOWING

Gatton Qld

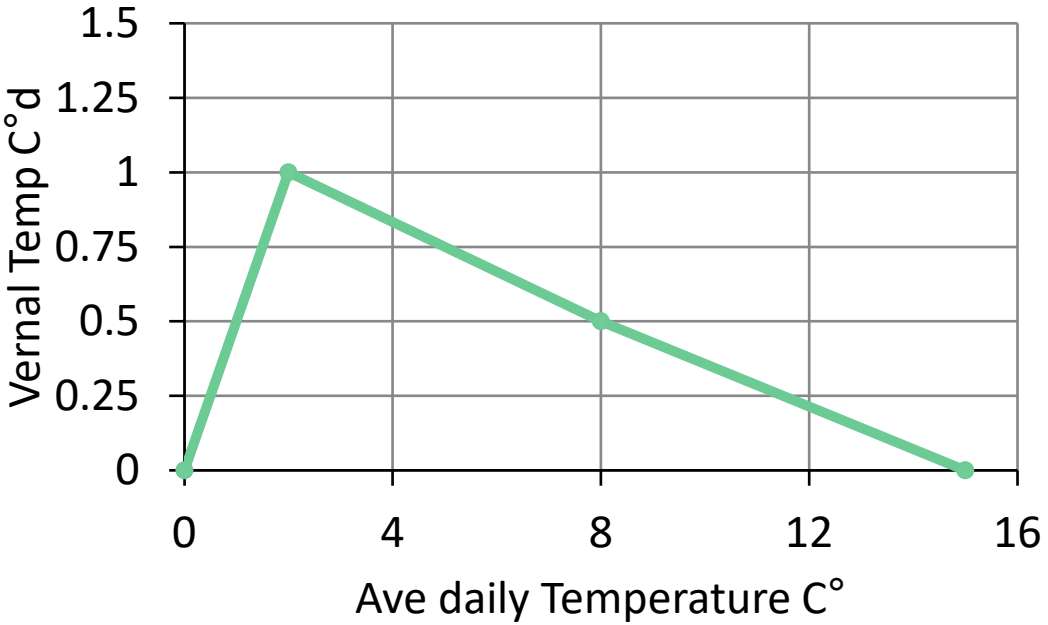
Ottawa Canada



Canberra ACT

Sown on the same day, photos taken on the same day, same cultivars three different environments

VERNALISATION



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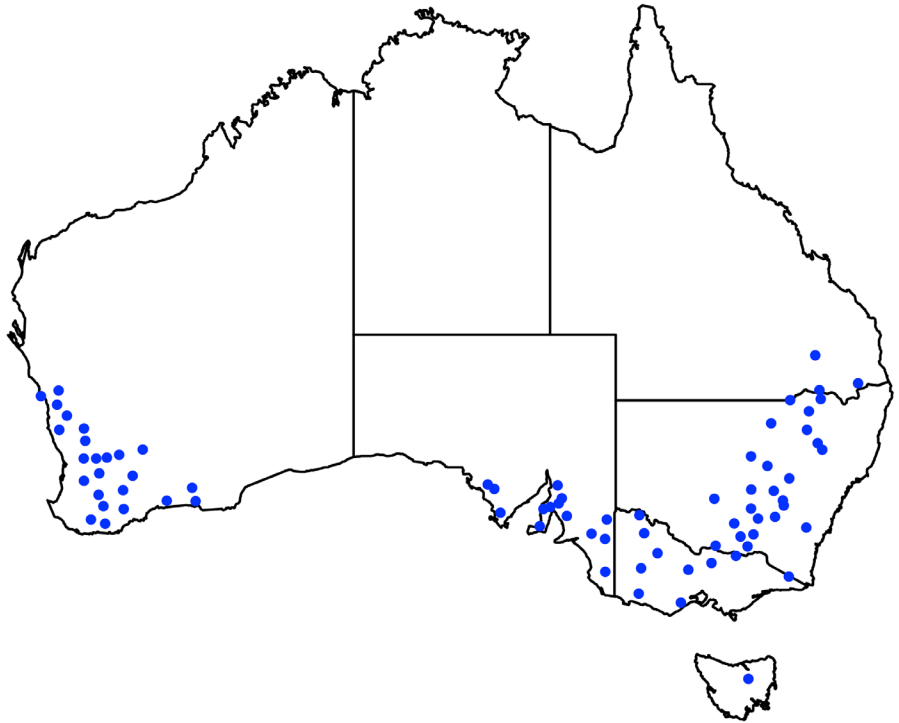
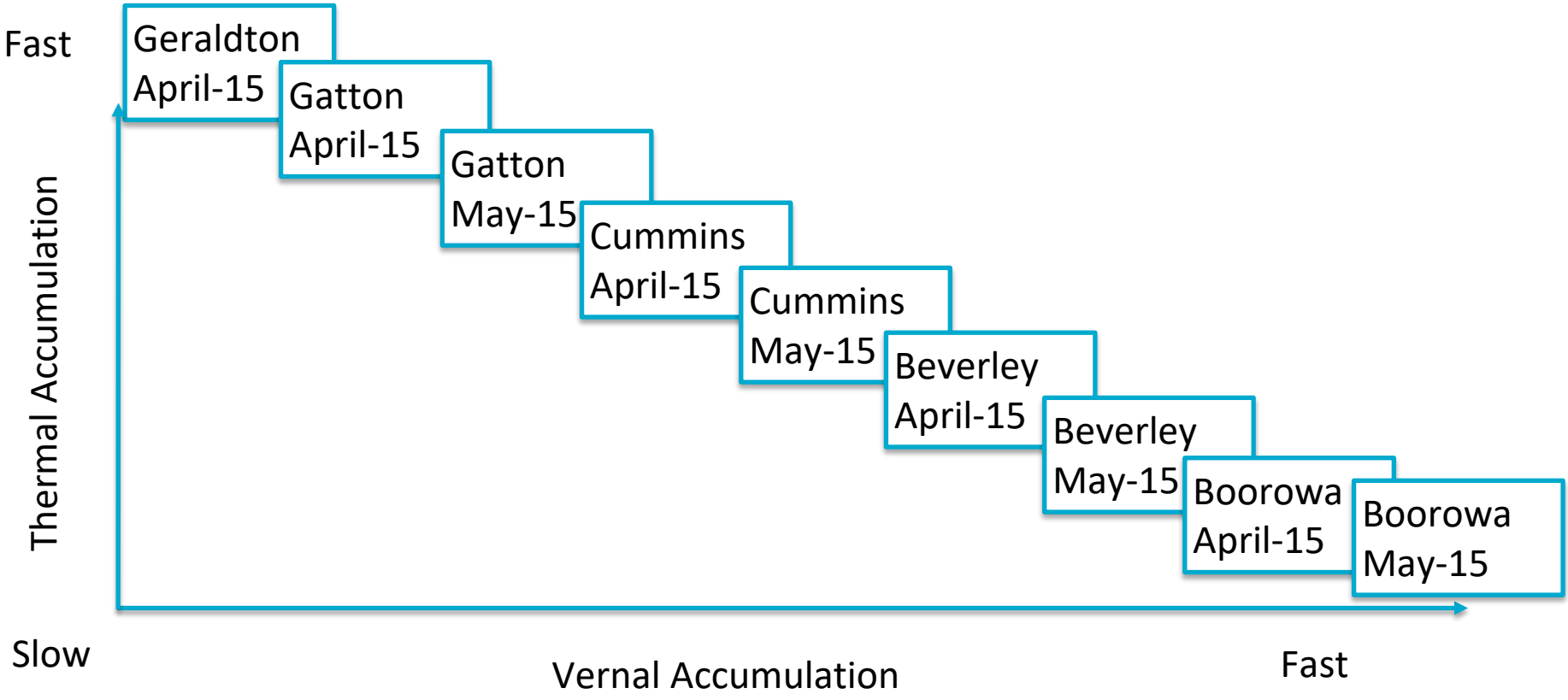
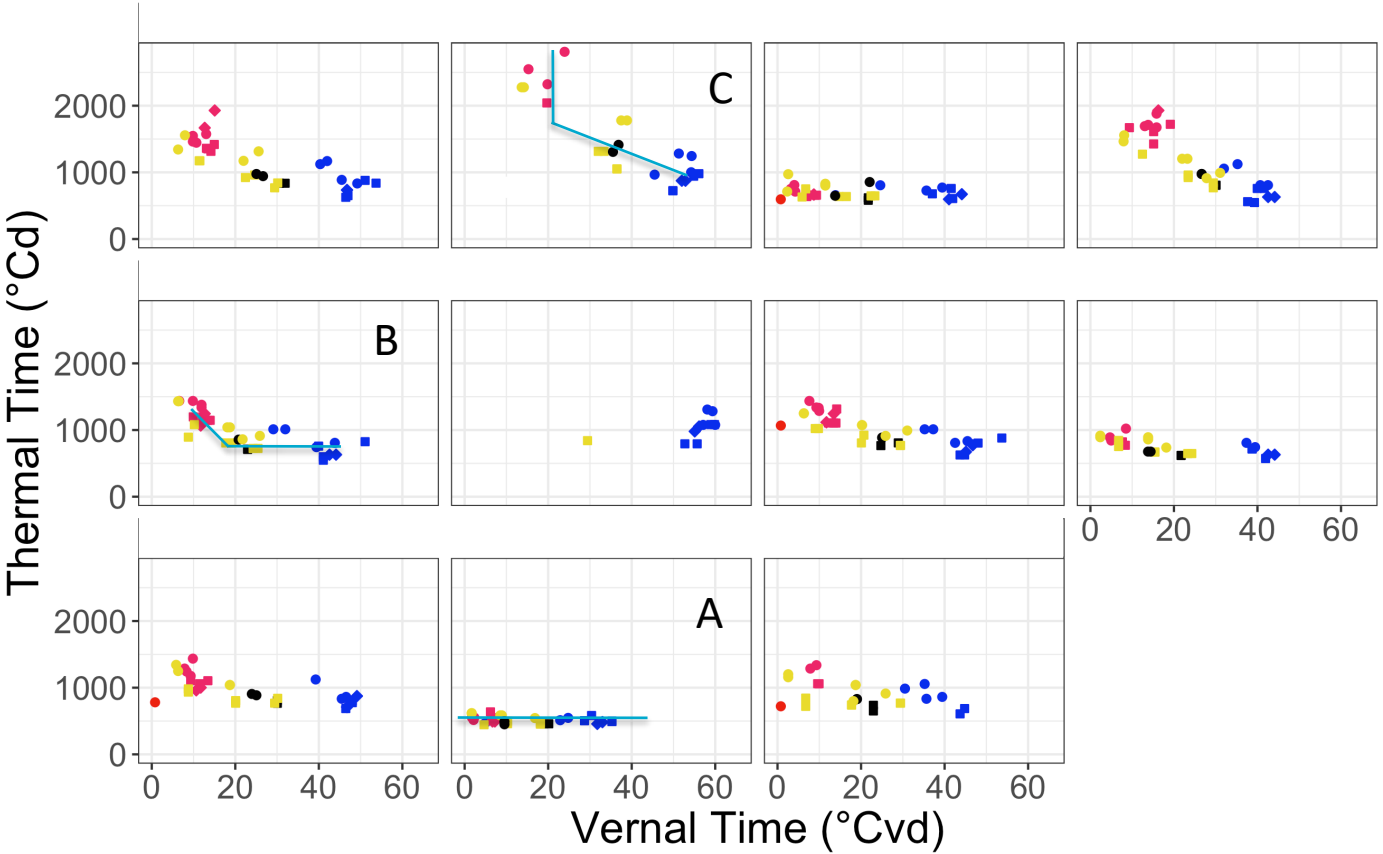
FIND DIFFERENT ENVIRONMENTS



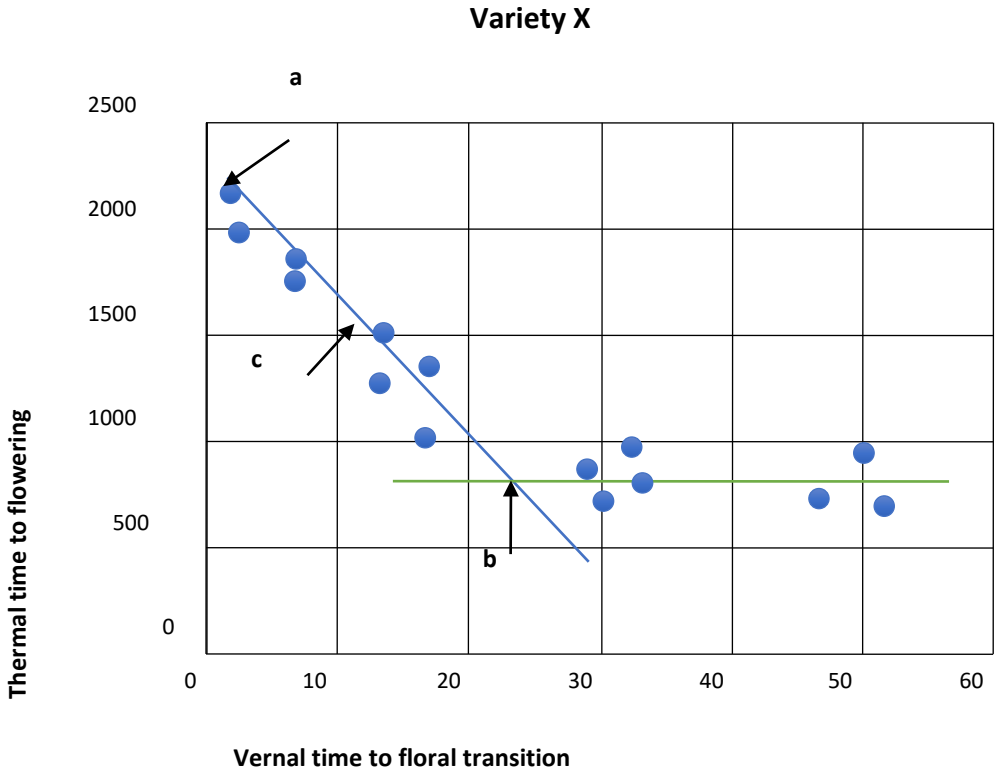
CLIMATE ANALYSIS



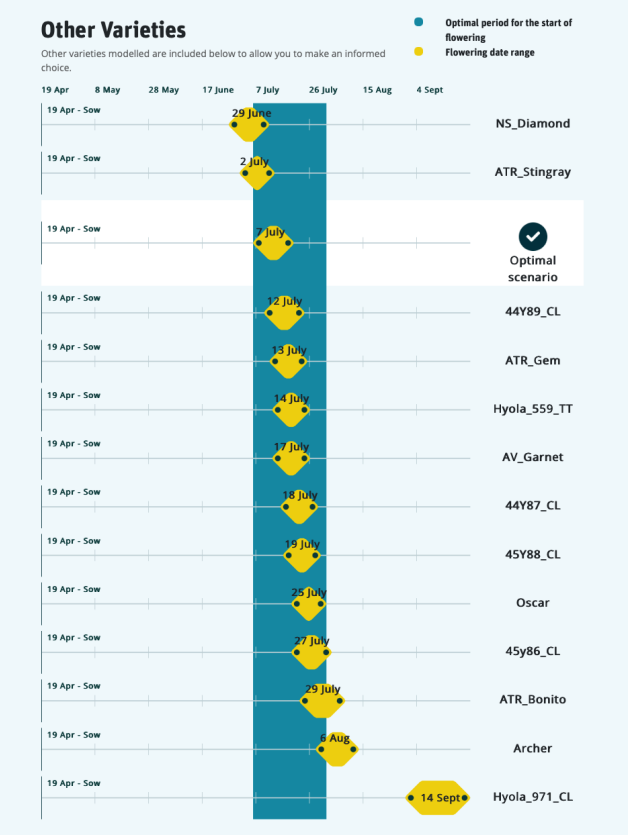
PHENOLOGY PROJECT



APSIM PARAMETERS



PUTTING IT ALL TOGETHER



https://www.canolaflowering.com.au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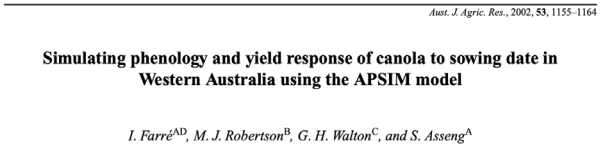
Goondiwindi for a 19 April sowing


Aust. J. Agric. Res., 2002, **53**, 1155–1164

Simulating phenology and yield response of canola to sowing date in Western Australia using the APSIM model

I. Farré[AD], *M. J. Robertson*[B], *G. H. Walton*[C], *and S. Asseng*[A]

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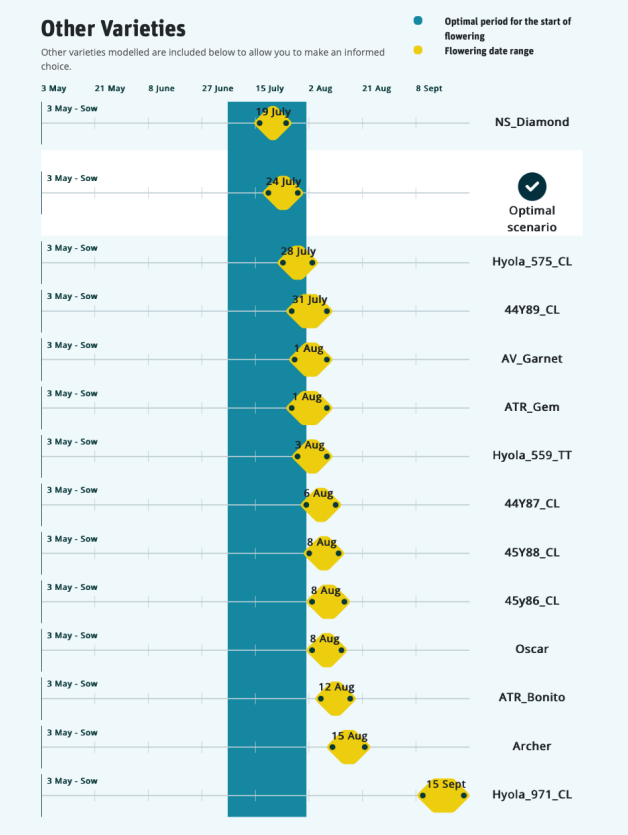

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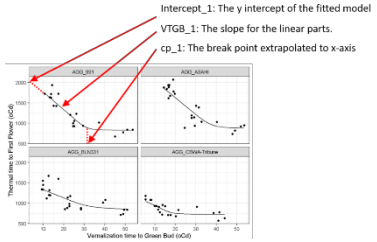
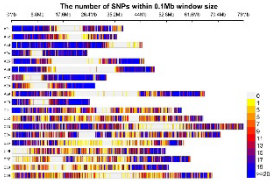
Hybrid genomics-APSIM-NG model



APSIM parameter optimisation



SNP data

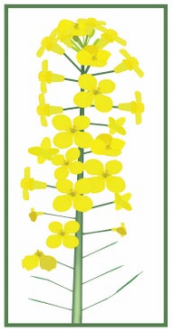
Genomic prediction
Random Forest

Genomic estimated APSIM parameters

Crop growth model
APSIM NG

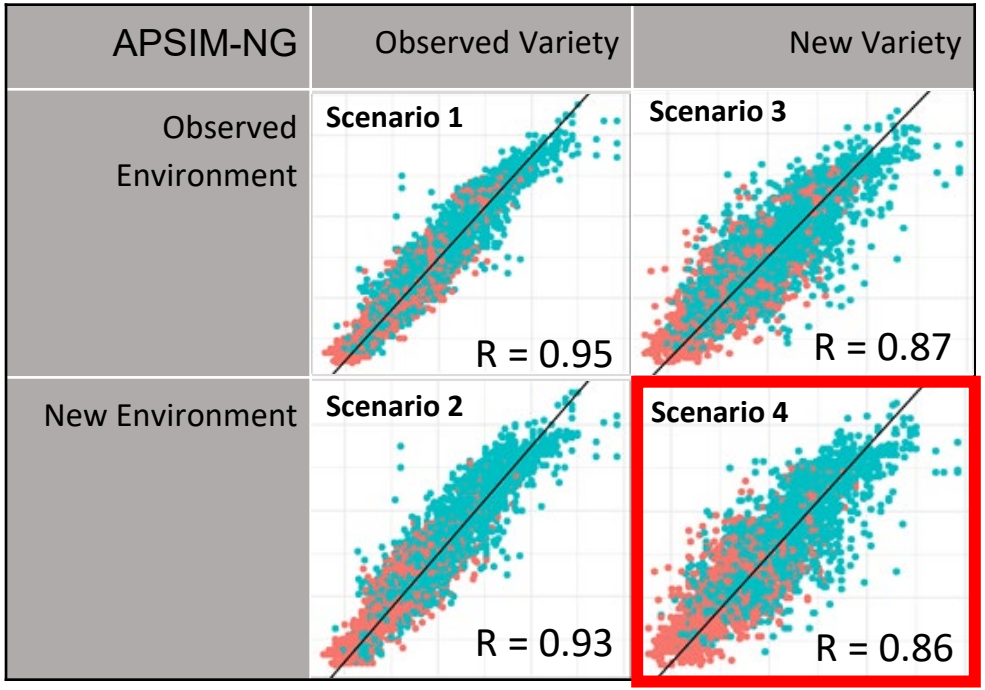
X-validation

Observed phenology



Flowering time prediction

Performance of the genomic model



Scenario 4
R = 0.87 and 0.82 AUS and international varieties

Error within < 10 days on for AUS lines

WHAT DO WE WANT

- A useful tool for flowering prediction.
- APSIM phenology parameters for new cultivars
- Expanding database that captures the genetic diversity of canola in Australia
- Strong honest relationship with breeding companies.

HOW WILL THIS HELP YOU ?

CROP FLOWERING PREDICTOR

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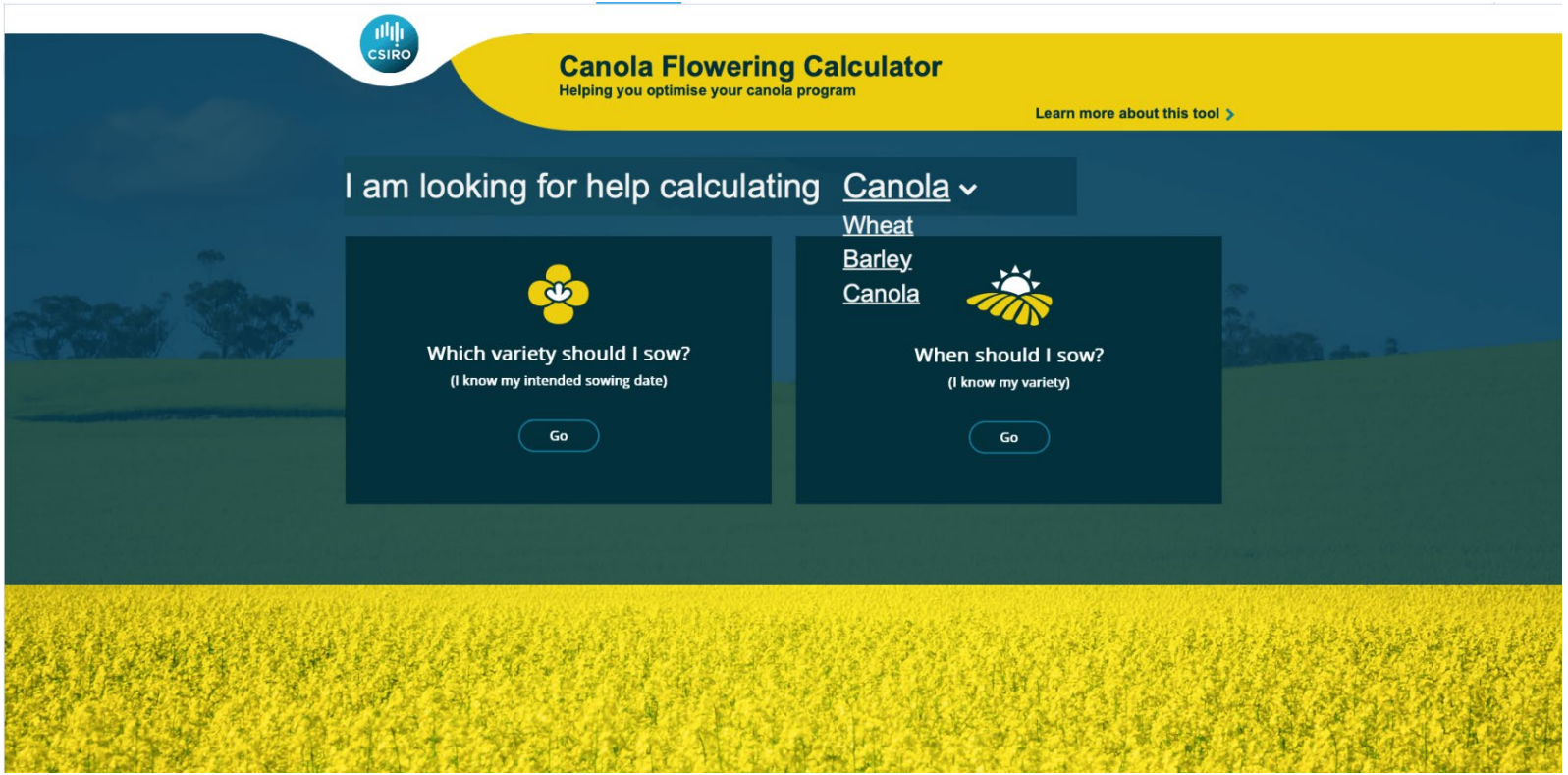

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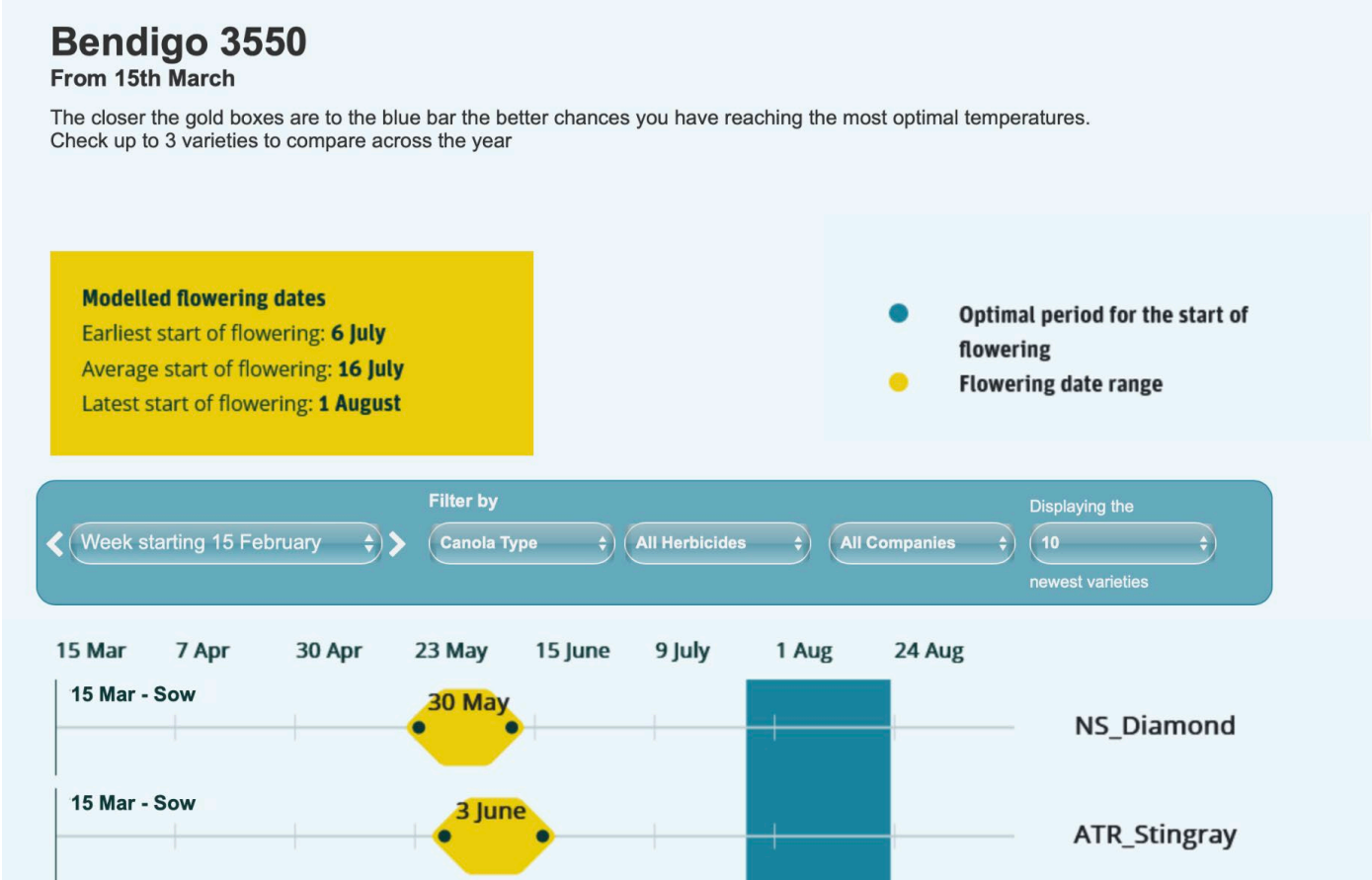
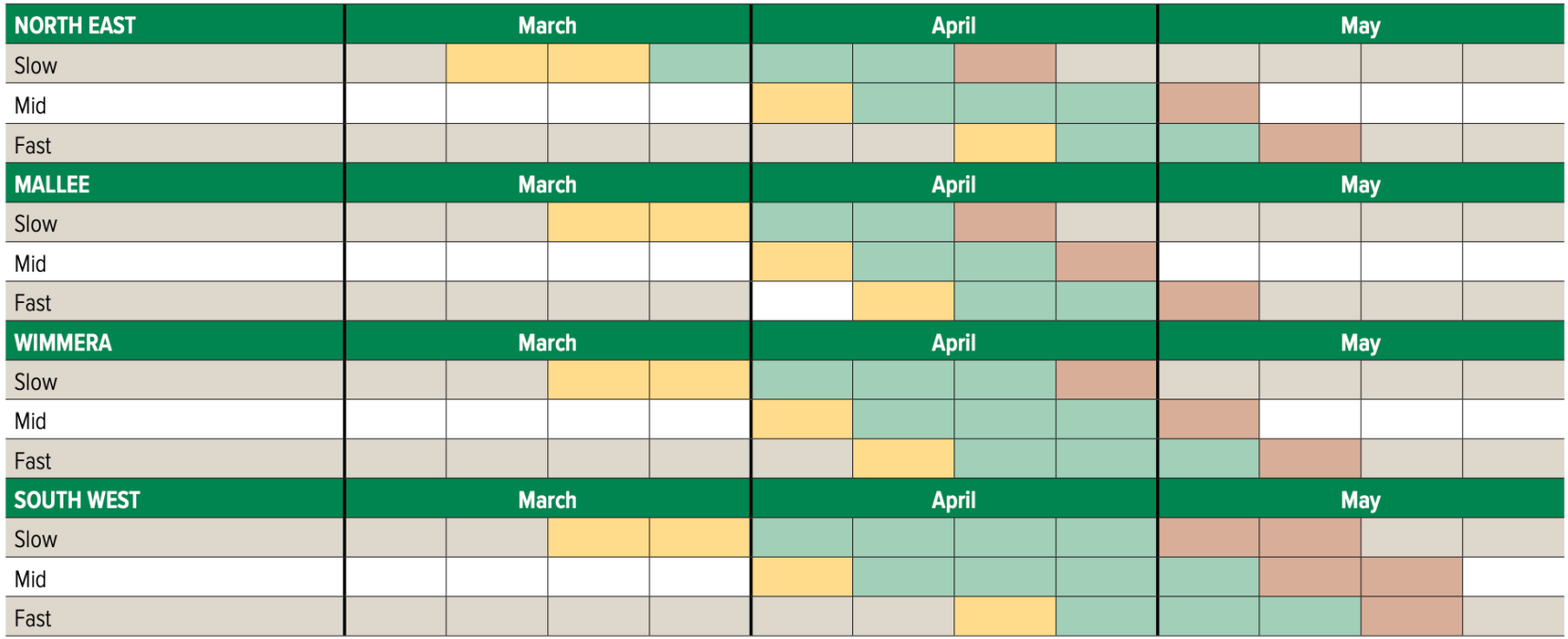


MORE ACCURATE INDEPENDENT FLOWERING INFORMATION CAN BE PROVIDED TO COMPANIES, STATE DEPARTMENTS AND GROWERS. SITE AND CULTIVAR SPECIFIC.

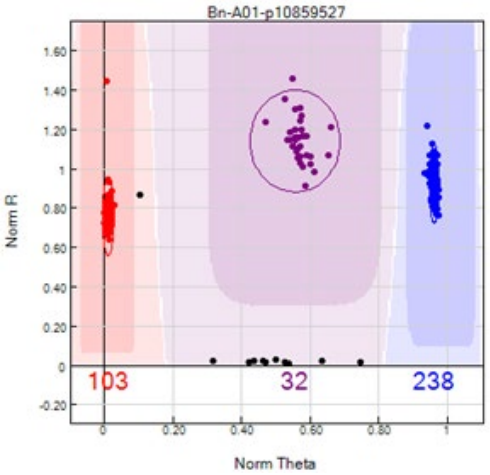
GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

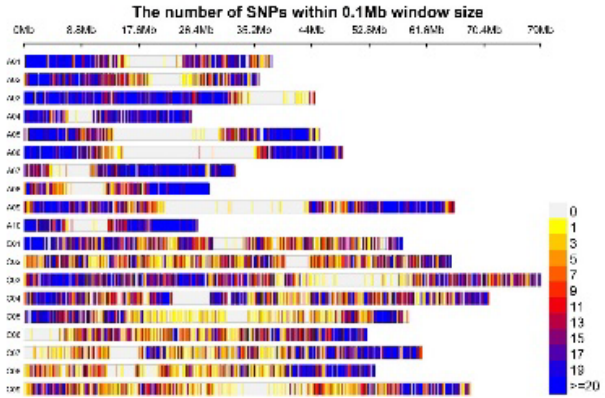
(December 2015).

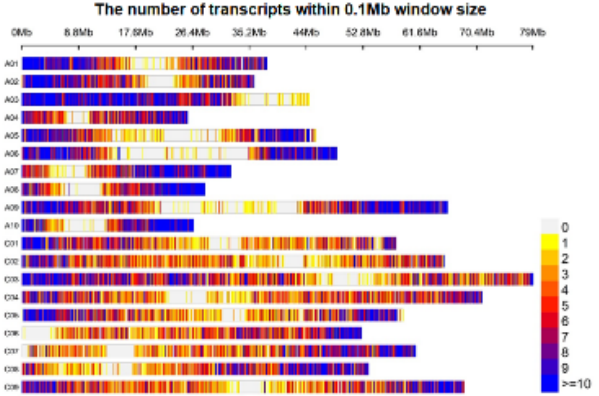


Yellow = risk of frost, disease infection and lower yield potential.
Green = on time.
Red = risk of drought and high temperature stress.

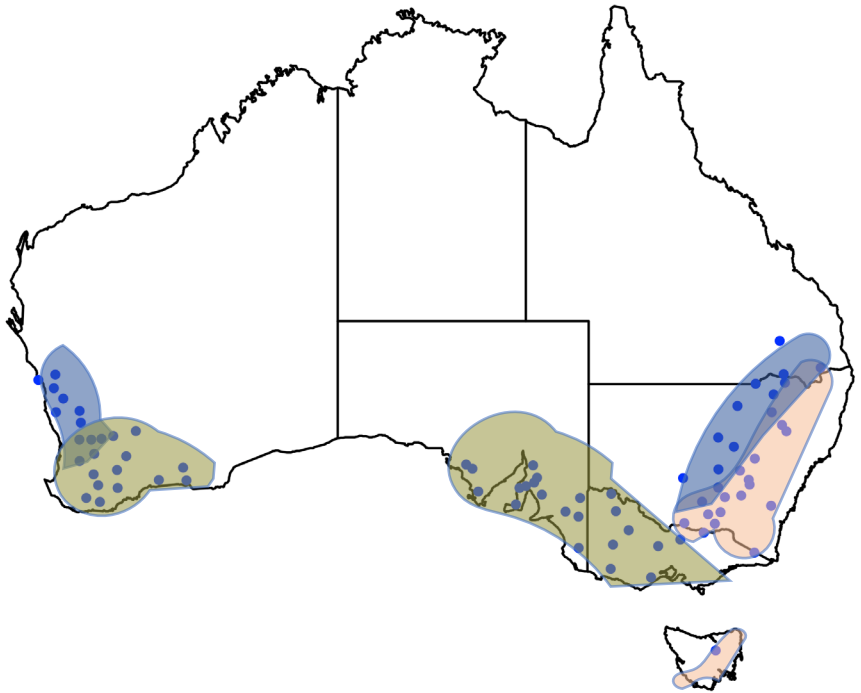
GENETIC DATA CAN BE RETURNED TO THE COMPANIES FOR USE WITHIN THEIR BREEDING PROGRAM







PRE-RELEASE DATA CAN BE PROVIDED SPECIFICALLY TO INDIVIDUAL COMPANIES ON A PERSONALISED ACCOUNT TO ASSESS THE ADAPTABILITY OF NEW MATERIAL



APSIM-NG	Observed	New Variety
Observed Environment	Scenario 1 R =	Scenario 3 R =
New Environment	Scenario 2 R =	Scenario 4 R =
	0.93	0.86

DO YOU SEE VALUE IN THIS PROJECT ?

THIS PROJECT NEEDS YOUR SUPPORT?

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WHAT ADDITIONAL INFORMATION OR WHAT ASSURANCES WOULD YOU REQUIRE, TO GET INVOLVED IN THIS FLOWERING PREDICTOR PROJECT

WHAT WOULD AN MTA LOOK LIKE ?

Jeremy Whish

jeremy.whish@csiro.au

0428763426