





## Optimising Canola Profitability

*Update and outcomes from 2017*

SUSTAINABLE AGRICULTURE FLAGSHIP



## Optimizing canola profitability (2014-2019)



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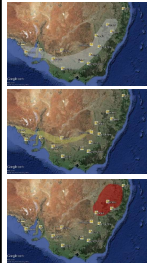

## The challenge.....

To deliver 3:1 return on investment by 2020

### Specific strategies

- Early sowing systems (low/medium rainfall)
- Risk management – low input (low rainfall)
- Harvest management (Module 3 - north)

• Up to date agronomic advice throughout


## Early Sowing

### Our strategy

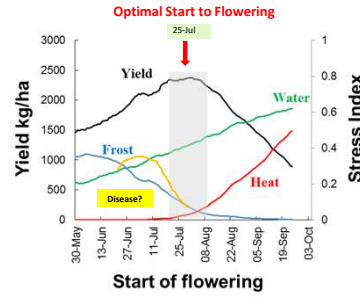
- Identify optimum flowering period for the different sites  
*frost, heat, water stress, radiation, disease* **Phase 1 (2014-2016)**
- Target sowing date x variety to hit the OFP  
*understand phenology adaptations*

↓

- Manage for adequate biomass at flowering for yield target  
*nitrogen, seeding rate, growth type (which is most cost-effective?)*
- Identify ways to allocate more of the biomass to grain  
*Interesting varietal traits?* **Phase 2**



## Flowering time is critical...



Yield kg/ha

Stress Index


Start of flowering

Frost, Disease?, Heat, Water

Optimal Start to Flowering 25-Jul

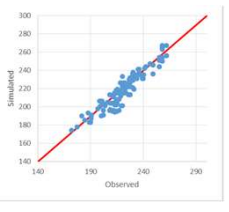
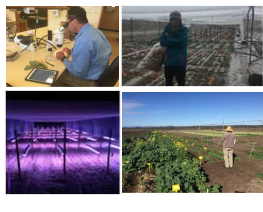
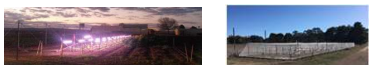
30-May, 13-Jun, 27-Jun, 11-Jul, 25-Jul, 08-Aug, 22-Aug, 05-Sep, 19-Sep, 03-Oct

Courtesy: Julianne Lilley CSIRO




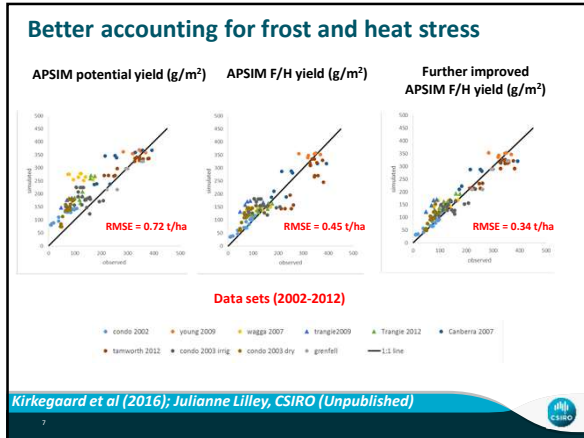
## APSIM – improved phenology predictions

### Flowering date (Yeelana 2014-2016)

Courtesy: Julianne Lilley and Jeremy Whish, CSIRO





### E-Booklet

#### Ten Tips to Early-Sown Canola

Changing rainfall patterns, declining summer fallow management and improved on-farm breeding systems have facilitated a shift to earlier sowing of canola, capitalising on soil moisture opportunities and reducing production risk. The Optimum Canola Profitability project, a collaborative project funded through GRDC, investigated the potential for early sowing of canola in regions from northern NSW to the Eyre Peninsula of South Australia, with a focus on financial agronomic requirements. The booklet:

**Noting outside early can increase productivity and profitability by following 10 important guidelines...**

- 1. Consider the location:** The main restriction on the South Australia, where low rainfall (less than 400mm) in March-April are likely to restrict early sowing to early April and May.
- 2. Early sowing amplifies differences in flowering time (phenology):** Earlier sowing can result in greater frost and disease risk of flowering and can reduce yield potential.
- 3. Selecting varieties for early sowing:** A breeding plan that incorporates two different canola phenology types (i.e. varieties with different flowering times) can help optimise production across the enterprise.
- 4. Sowing later developing varieties early can expose them to greater frost and disease risk of flowering and can reduce yield potential.**
- 5. A sowing plan that incorporates two different canola phenology types (i.e. varieties with different flowering times) can help optimise production across the enterprise.**

<https://grdc.com.au/10TipsEarlySownCanola>

### Proposed 'phenology' ratings of canola varieties compared with commercial 'maturity' ratings

24 canola varieties (below, some now outclassed) were included in the Optimised Canola Project from 2014-2016. Phenology differences between varieties were a major yield determinant in the project, however phenology did not relate to commercial maturity ratings for early sowing. The project committee is encouraging industry to adopt more accurate phenology terminology as described below to guide sowing date decisions and target the Optimal Start of Flowering period. Other newer varieties are available that may also be suited to early sowing, including those indicated\* below.

Variety	Phenology (time from sowing to flowering when sown early)	Maturity (as supplied by breeding companies)	Herbicide tolerance	Hybrid or OP (open pollinated)
Diamond	fast	early	conventional	OP
ATR Stingray	fast	early	triazine	hybrid
INSO RR	fast	early	Roundup	hybrid
Hyola 572CL	fast	mid to mid-early	imidazolinone	hybrid
41380 CL	fast	early	imidazolinone	OP
44784 CL	mid-fast	early-mid	imidazolinone	hybrid
44784 CL	mid-fast	early-mid	imidazolinone	hybrid
44790 CL	mid-fast	early-mid	imidazolinone	hybrid
ATR Bonito	mid-fast	early to early-mid	triazine	OP
45786 CL	mid-fast	mid	imidazolinone	hybrid
44787 CL	mid	early-mid	imidazolinone	hybrid
ATR Gem	mid	mid-early	triazine	OP
Hyola 5591T	mid	mid	triazine	hybrid
45788 CL	mid	mid	imidazolinone	hybrid
Carrot	mid	mid to mid-early	conventional	OP
GT50 RR	mid	mid	Roundup	hybrid
Hyola 572CL	mid-slow	mid	imidazolinone	hybrid
Hyola 500RR	mid-slow	mid to mid-late	Roundup	hybrid
45725 RR	mid-slow	mid	Roundup	hybrid
45791 CL*	mid-slow	mid	imidazolinone	hybrid
ATR Washo	mid-slow	mid-late	triazine	OP
Hyola 7501T	mid-slow	mid-late	triazine	hybrid
Hyola 725RT	mid-slow	mid-late	Roundup & triazine	hybrid
Archer	slow	mid-late	imidazolinone	hybrid
Victory 72001 CL*	slow	mid-late	imidazolinone	hybrid
Hyola 570CL*	very slow (winter)	winter	imidazolinone	hybrid
575000 CL*	very slow (winter)	winter	imidazolinone	hybrid

**Fast or mid-fast developing varieties can have high yield potential but are not suited to early sowing.**

**Select mid-slow or slow developing varieties for sowing before mid-April.**

### Optimal Start of Flowering (OSF)

**OSF = Optimal Start of Flowering:** Target flowering to start within the acceptable range of the OSF date to minimise frost/dry water stress, and maximise yield.

Region	Optimum date	Acceptable range (days)	Based on	With PAV
Northern NSW & Southern OSF				
Mungindi	6-Jul	21	slow/develop	125 mm
Murrumbidgee	7-Jul	28	slow/develop	125 mm
Geelong/indral	11-Jul	18	slow/develop	125 mm
Wagga	12-Jul	17	slow/develop	125 mm
Monze	18-Jul	22	slow/develop	125 mm
North Star	22-Jul	29	slow/develop	125 mm
Condofine	25-Jul	22	slow/develop	125 mm
Trange	26-Jul	26	slow/develop	125 mm
Harrold	31-Jul	23	slow/develop	125 mm
Condon	1-Aug	20	slow/develop	125 mm
Warwick	9-Aug	11	slow/develop	125 mm

Region	Optimum date	Acceptable range (days)	Based on	With PAV
South Australia				
Mitnappa	15-Jul	22	slow/develop	125 mm
Wyalapa	16-Jul	8	slow/develop	125 mm
Kadina	16-Jul	27	slow/develop	125 mm
Lameroo	17-Jul	29	slow/develop	125 mm
Glendide	17-Jul	40	slow/develop	125 mm
Lennox	19-Jul	9	slow	125 mm
Bute	19-Jul	35	slow/develop	125 mm
Spaling	20-Jul	16	slow/develop	125 mm
Renmark	21-Jul	18	slow/develop	125 mm
Booderee	22-Jul	28	slow/develop	125 mm
Yarabidgee	23-Jul	18	slow/develop	125 mm
Start	25-Jul	31	slow/develop	125 mm
Tarlee	26-Jul	15	slow/develop	125 mm
Narracoorte	7-Aug	14	slow/develop	125 mm

Region	Optimum date	Acceptable range (days)	Based on	With PAV
Central & Southern NSW				
Hillston	23-Jul	22	slow/develop	125 mm
Condon	25-Jul	21	slow/develop	125 mm
Edley	25-Jul	28	slow/develop	125 mm
Lockhart	31-Jul	29	slow/develop	125 mm
West Wyalapa	1-Aug	27	slow/develop	125 mm
Castlemaine	1-Aug	15	slow/develop	125 mm
Fulera	1-Aug	19	slow/develop	125 mm
Wyalapa	1-Aug	12	slow/develop	125 mm
Wagga Wagga	5-Aug	32	slow/develop	125 mm
Conze	1-Aug	27	slow/develop	125 mm
Culcairn	8-Aug	26	slow/develop	125 mm
Terowie	13-Aug	21	slow/develop	125 mm
Young	10-Aug	35	slow/develop	125 mm

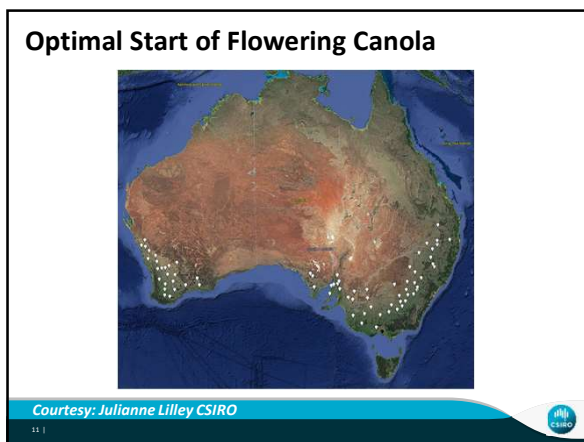
Region	Optimum date	Acceptable range (days)	Based on	With PAV
Victoria				
Shepparton	13-Jul	8	slow/develop	125 mm
Mildura	14-Jul	15	slow/develop	125 mm
Dryden	15-Jul	19	slow/develop	125 mm
Geelong	7-Aug	20	slow/develop	125 mm
Burra	7-Aug	30	slow/develop	125 mm
Shepparton	7-Aug	30	slow/develop	125 mm
Beveridge	8-Aug	32	slow/develop	125 mm
Coleraine	14-Aug	35	slow/develop	125 mm
Hendon	14-Aug	37	slow/develop	125 mm

**OSF range 20 days: median OSF range 20-25 days, long OSF range 3-5 days**

**In northern NSW:** target the later end of the OSF range to avoid severe frost damage on an open root system prior to imbibition heat and water stress in late flowering crops.

**In southern and high rainfall areas with high canopy intensity:** target the later end of the OSF range to imbibition disease risk in upper canopy blocks (i.e. top canopy).

**#SowSoEarly**



### Towards a sowing date App

Canola Phenology Modelling

Select sowing date, Choose cultivar, Nearest OSF location, Update, Select a site

### Towards a sowing date App

Canola Phenology Modelling

Select a site

Select sowing date

Choose cultivar

Nearest OSF location

OSF

Flowering date

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### Towards a sowing date App

Canola Phenology Modelling

New sowing date

Choose cultivar

Nearest OSF location

Update

OSF

Flowering date

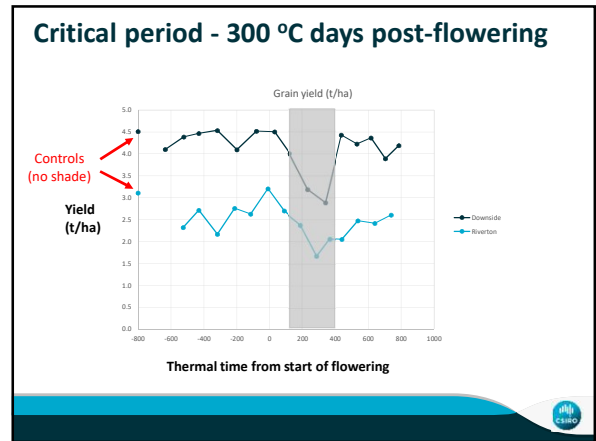
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### Critical period for yield and oil in canola

85% shade for ~1 week

Optimised Canola Profitability

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### Working hypothesis....

Direct impact of assimilate on pod number

and

Reduced capacity for surviving pods and seeds to compensate

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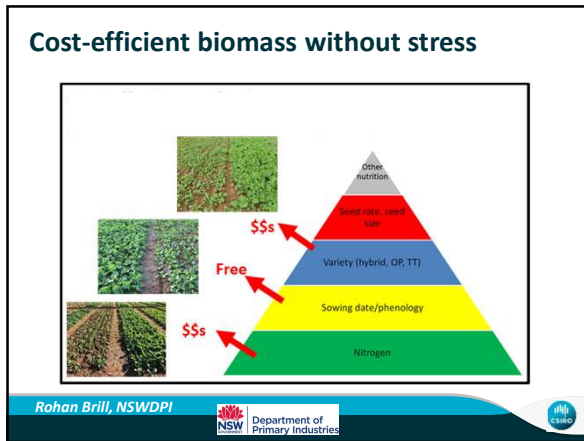
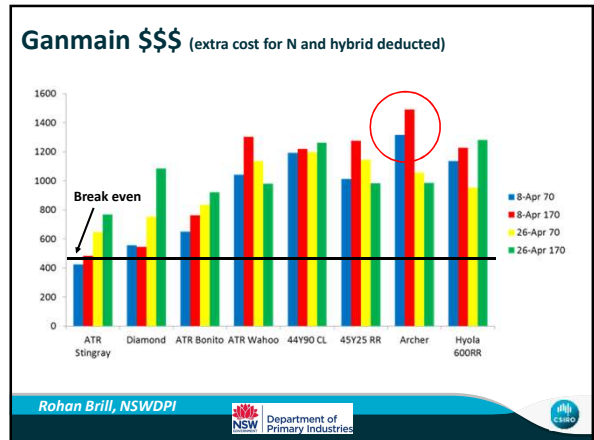
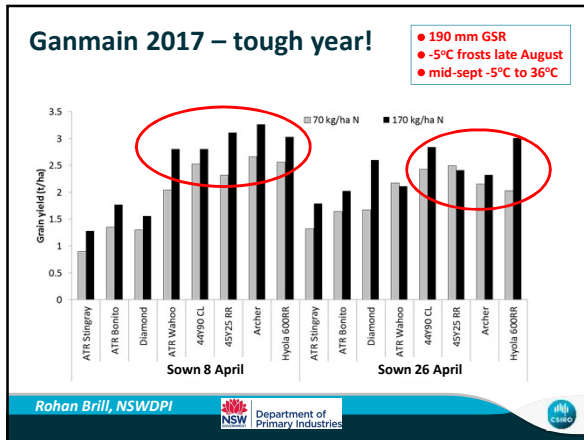
### Consolidation of agronomy advice

*"My clients now plan to finish rather than start sowing canola on ANZAC Day and I estimate a 0.3 t/ha increase above 1.7 t/ha average"*

Greg Condon, Junee

- Manages 10,000 ha of canola in southern NSW
- Potential value \$150/ha per annum (\$15 Mill pa)
- Large potential benefits across ~1 Mill ha of canola

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This work is a component of the Optimised Canola Profitability Project (CSP00187), a collaboration between CSIRO, NSW DPI and GRDC in partnership with SARDI, CSU, MSF, BCG.

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Julianne Lilley	Brett Cocks	Rick Graham	Brendan Christy	Daryl Reardon
Susie Sprague	Andrew Ware	Blake Gontar	Ian Ludwig	Christine Walela

Thank you

www.csiro.au

GRDC | NSW Department of Primary Industries | Victorian Sustainable Farming | VICTORIA | BCG | Charles Sturt University | CSIRO

### The challenge.....

To deliver 3:1 return on investment by 2020

#### Specific strategies

- Early sowing systems (low/medium rainfall)
- Risk management – low input (low rainfall)
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Rohan Brill, NSW DPI | NSW Department of Primary Industries | CSIRO

### Main outcomes

- OP-TT vs Hybrid?
  - OP-TT? – New varieties +15% at Lameroo (eg HyTTeC Trophy)
- Sowing time
  - Earliest “opportunity” after mid-April
  - Ensure success, or pull out
- N management – can we delay?
  - Amount more important than timing
  - Best to have N upfront to cover Decile 5?
  - Maybe better to grow after legume
  - Maybe chance to zone manage N on variable soil (Karoonda)
- Whole-farm context may override decision

Andrew Ware, Michael Moodie, Therese McBeath


Rohan Brill, NSW DPI | NSW Department of Primary Industries | CSIRO

### SA 2017 NVT TT results



Variety/	Site	Riverton	Spalding	Turretfield	Arthurthur	Minlaton	Lameroo	Keith	Frances
<b>Triazine Tolerant</b>									
ATR Bonito	-	84	89	-	-	95	93	94	-
ATR Mako	92	-	96	94	-	-	-	-	-
ATR Stingray	-	89	93	91	97	-	-	95	-
ATR Wahoo	97	-	-	-	-	-	-	-	103
BCS 560TT	100	-	96	99	101	-	101	-	94
DC 670TT	105	-	103	104	-	-	-	-	107
Hyola 350TT	-	108	-	100	105	98	95	106	-
Hyola 550TT	94	108	93	101	-	-	-	-	93
Hyola 650TT	104	-	94	104	-	-	-	-	-
HYTec Trophy	111	127	108	108	114	117	123	114	-
InVigor T 4510	113	113	108	108	101	114	102	108	-
Monota 515TT	75	-	-	-	-	-	-	-	81
Pioneer 44T02 TT	-	115	-	99	101	98	102	-	-
SF Ignite TT	108	-	100	99	-	-	-	-	111
SF Turbine TT	105	114	96	96	99	104	98	-	-
Site mean yield (t/ha)	2.40	1.79	2.38	2.96	2.53	1.29	1.64	2.94	-
Lsd (0.05%)	8	13	7	5	70	13	10	11	-

### Field trials (Risk for Reward)

- Time of sowing  
fixed or wait for break
- Hybrid vs OP
- N management  
amount and timing



9 site years 2014 to 2017

Monpara to Mildura - 628 km drive

Andrew Ware, Michael Moodie, Therese McBeath

