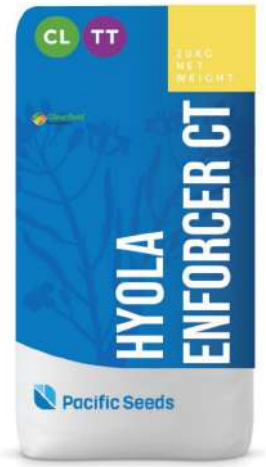
TECHNOTE 2021

CANOLA

# HYOLA ENFORCER CT

**CLEARFIELD®**
**+ TRIAZINE TOLERANT**

Clearfield Production System




High yielding Clearfield® + Triazine hybrid protecting growers' investment & returns

## HYBRID ATTRIBUTES

CT Technology shows up to $1000/ha* value in crop protection from Group B IMI soil residue (*Summer application timing)

Dual herbicide tolerance perfectly designed for use of either or both chemistries in IWM cropping rotations and for herbicide resistance management

High grain yields and oil% with competitive gross returns in $/ha across some environments vs hybrids; InVigor T4510 and HyTTec Trophy.

Specifically adapted to the 1.25t/ha to 3.5t/ha growing regions

Excellent Blackleg Tri-Gene Rating of R, much higher resistance than all OP TT varieties

Excellent early vigour providing higher weed suppression than most OP TT varieties

Additional protection from boom spray contamination with IMI residues in tank

| | |
|---|---|
| Yield adaptability | 1.25 - 3.5t/ha |
| Growing Zones | MRZ - HRZ |
| Blackleg rating/groups | R - ADF |
| Oil potential | High |
| Herbicide tolerance | CL + TT |
| Maturity | Mid - Early |
| Plant vigour | 7.5 |
| Plant height | Medium |
| #Lodging resistance | 7.0 |
| **Shatter tolerance | 8.0 |
| ^Hectolitre weight | 8.0 |
| Growing regions | NSW, SA, Vic, WA |
| Irrigation/dryland | Both |
| Alternatives to | HyTTec Trophy, InVigor T4510, InVigor T6010, RGT Capacity TT, ATR Bonito, ATR Wahoo, HyTTec Trifecta |

# Indicates observed visual rating from Pacific Seeds R&D internal replicated research trial evaluations
**Indicates observed visual rating from Pacific Seeds R&D replicated research trial evaluations comparing Hyola products
^ Indicates calculated weight rating from Pacific Seeds R&D internal replicated research trial evaluations
Scale: 1 = poor - 9 = best



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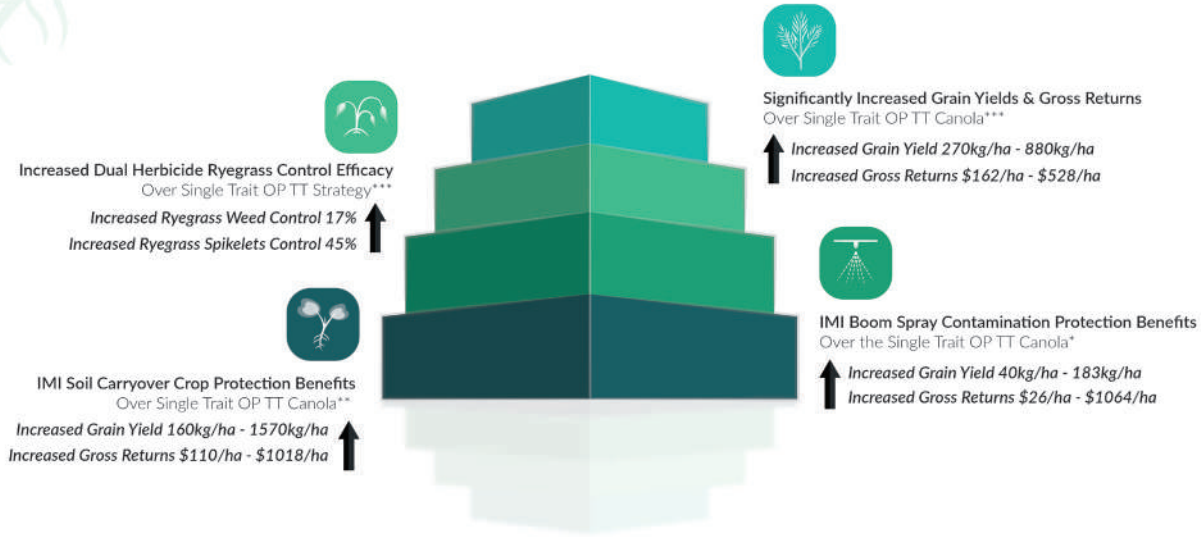
# Hyola CT Technology Stacked Value

*Delivering Flexible Solution-Driven Profits to Growers*




*Based on Pacific Seeds 2019 Replicated Technical Extension Research Trials using 30ml/ha Intervix® applied at 4-6 leaf Stage, conducted over 5 environments. **Based on Pacific Seeds 2020 Replicated Technical Extension Research Trials with 5 different IMI chemical treatments applied in Summer, conducted over 3 environments.***Based on Pacific Seeds 2020 Replicated Technical Extension Research IWM Trials using various XC vs XX vs CL vs CT vs TT chemical strategies, conducted over 3 environments.

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# 2020 IMI Residue Research Trials showed up to $1000 per Ha Crop Protection

CT STACKED TECHNOLOGY PROTECTED FROM GROUP B IMI SOIL CARRYOVER

TT SINGLE TRAIT TECHNOLOGY DAMAGED BY GROUP B IMI SOIL CARRYOVER

| Compared to CT Technology | *Summary of Treatment Results (TT Canola Losses) | | |
|---|---|---|---|
| Herbicide Treatment Description | Yield kg/ha Loss Range | % Yield Loss Range | Gross Returns $/ha Loss Range |
| Application Timing/IMI Rates | Loss Expressed from Lowest to Highest Yielding Values across Trial Sites | | |
| Summer Applied Low IMI Residue/TT spray - 375mL/ha Intervix® | 260kg/ha to 800kg/ha | 13% to 50% | $169/ha to $518/ha |
| Summer Applied High IMI Residue/TT spray - 750mL/ha Intervix® | 230kg/ha to 930kg/ha | 12% to 58% | $152/ha to $604/ha |
| Summer Applied IMI Residue/TT spray - 40g/ha OnDuty® | 430kg/ha to 1550kg/ha | 14% to 77% | $280/ha to $1008/ha |
| Summer Applied IMI Residue/TT spray - 45g/ha Raptor® | 160kg/ha to 890kg/ha | 8% to 56% | $101/ha to $582/ha |
| Summer Applied IMI IMI Residue/TT spray – 70g/ha Spinnaker® | 310kg/ha to 1570kg/ha | 10% to 78% | $201/ha to $1018/ha |

2020 Pacific Seeds Hyola CT Replicated IMI Residue Trials over three locations across Australia where Trial mean yields ranged from 1.64 – 2.97t/ha.

*Effects are greater in soil types where the herbicides were more mobile due to acid soils and higher rainfall after sowing and not always individual trial total rainfall. Hyola® CT Technology has been developed specifically for normal crop growth protection against Imidazolinone soil residues and is not promoted or recommended for use as having high levels of tolerance to levels of Group B - SU carryover. Refer to Pacific Seeds Hyola® CT Stewardship guide for specific growing guidelines.



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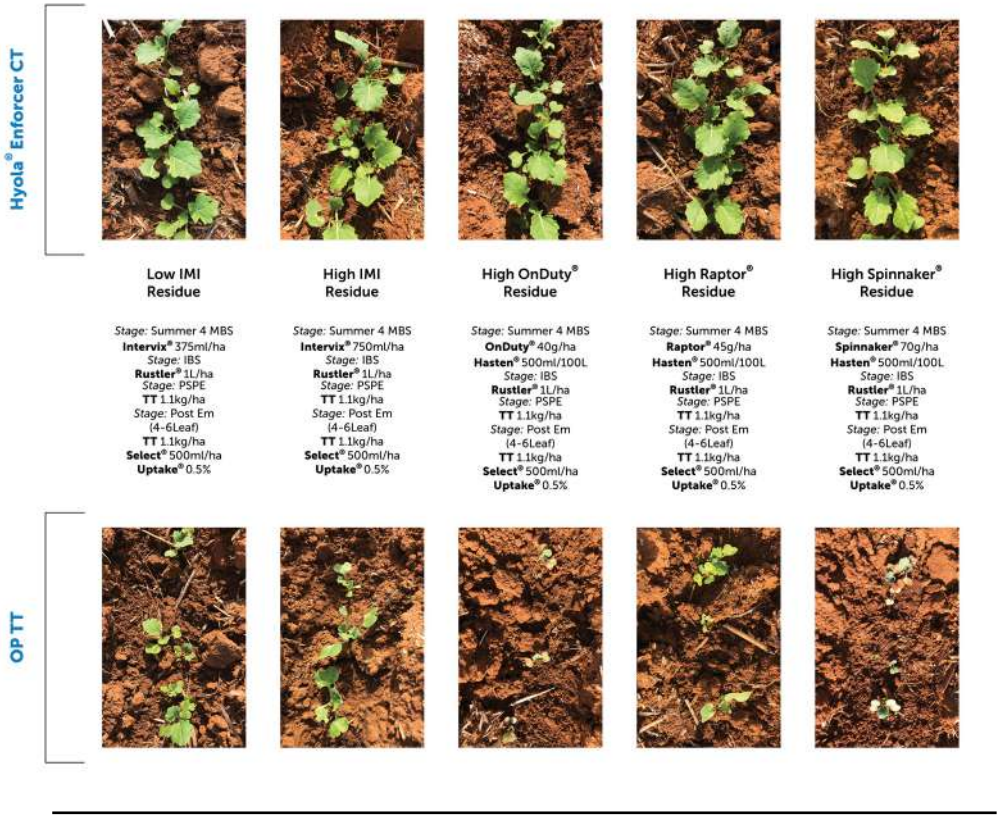
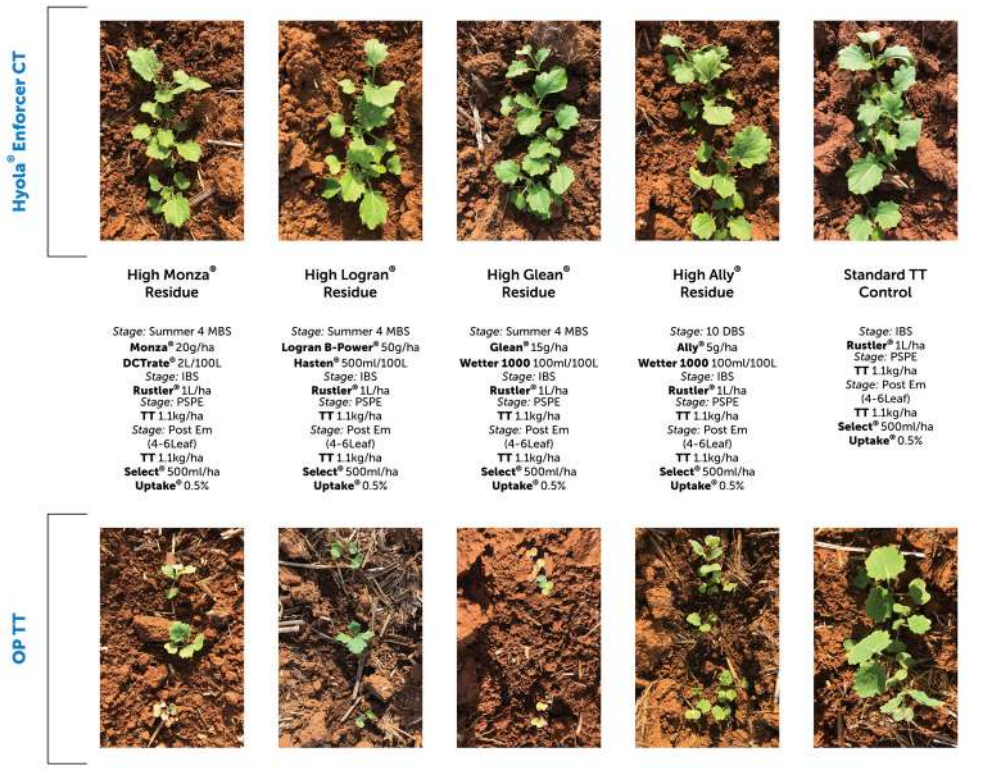
# Hyola CT versus OP TT IMI + SU Herbicide Carry Over Treatment Comparisons

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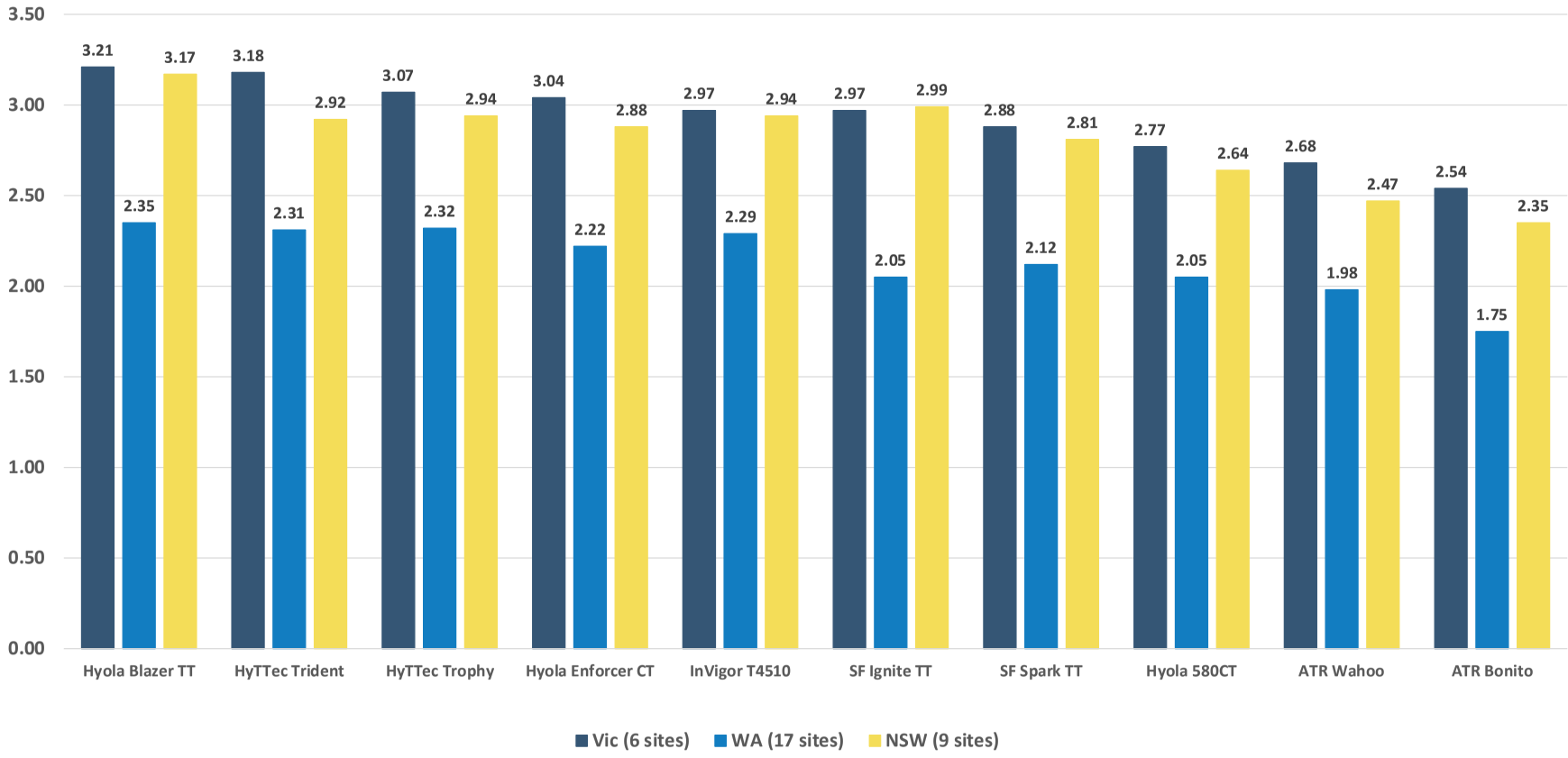
## 2020 Pacific Seeds Research State Trials show Hyola Enforcer CT with extremely competitive yields




2020 Pacific Seeds Breeding Research TT Tirals - Mean Analysed Yield (T/ha) by State over 32 sites where all varieties were common.

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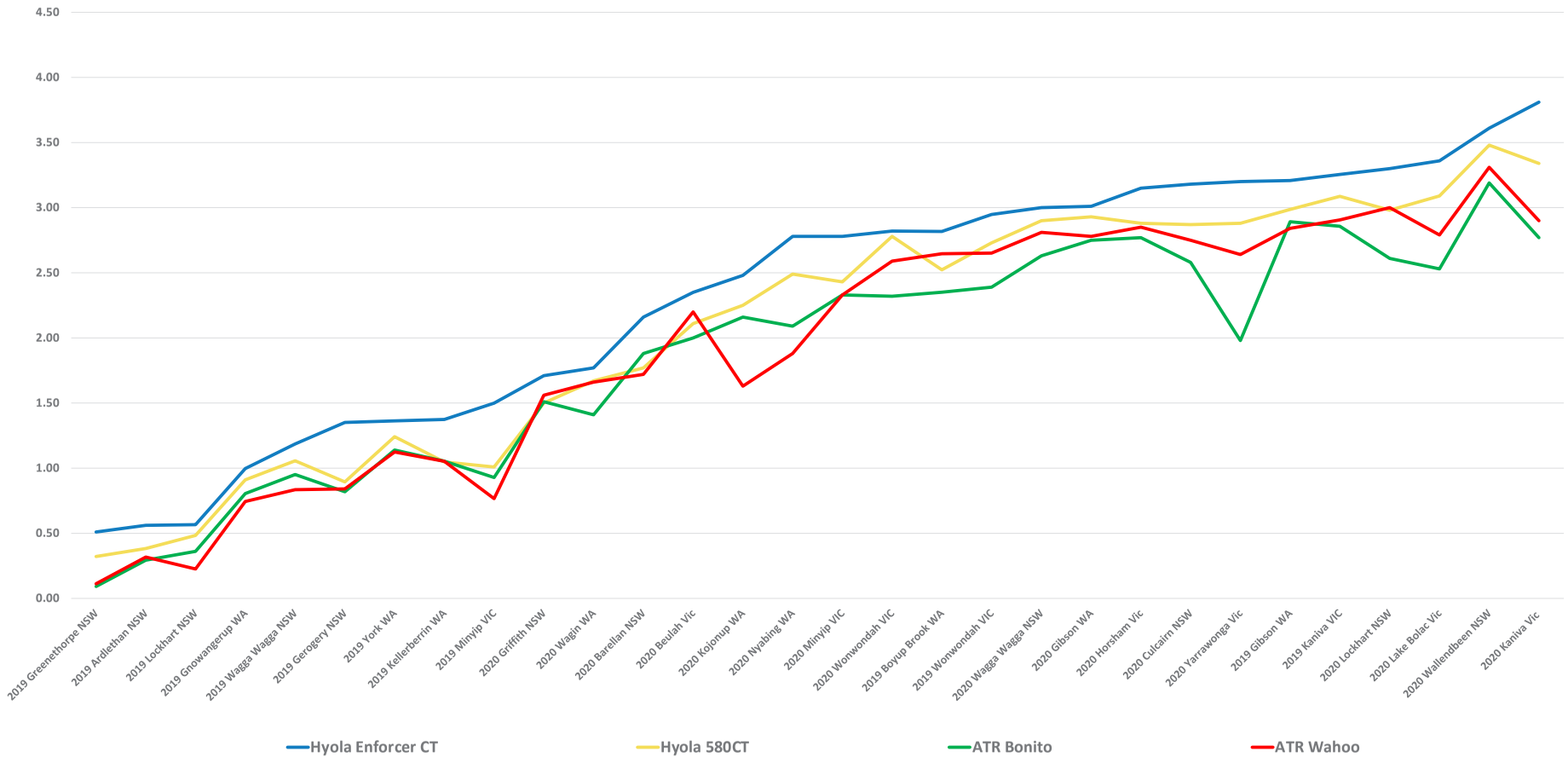
## Hyola Enforcer CT express significantly higher yields than OP TT varieties across many environments




2020 Pacific Seeds replicated breeding research trial results expressed as the mean analysed yield (t/ha) across lower to higher yielding environments in 32 locations where all 5 varieties were common.

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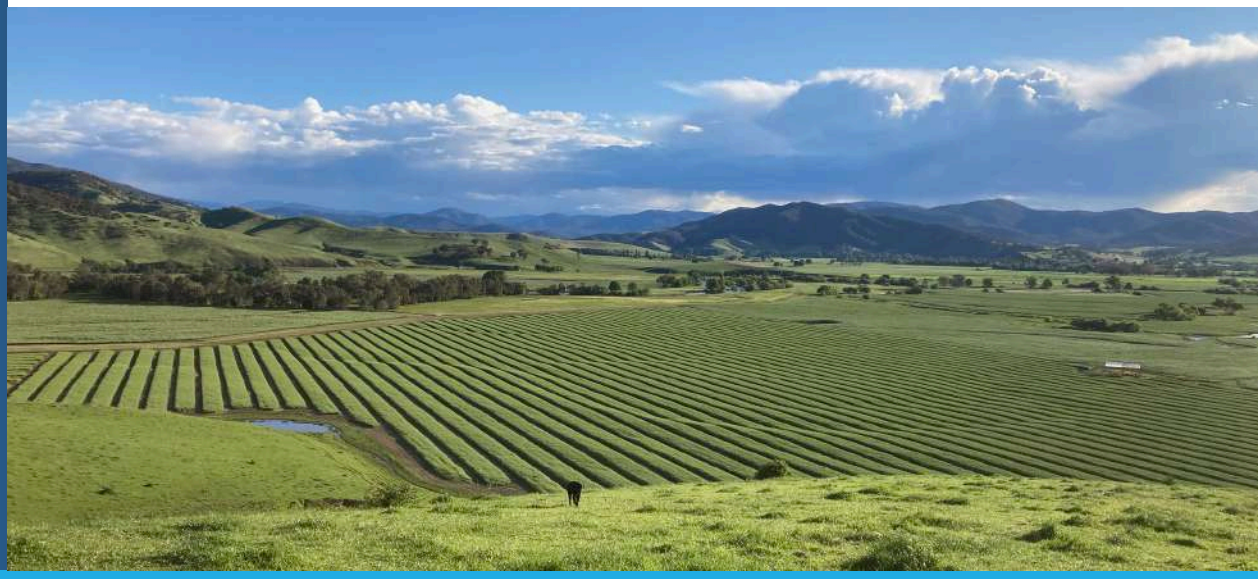
## 2016-2020 GRDC NVT Australian Long Term Analysed Mid TT Results

| GRDC NVT MID 2016-2020 Variety | Yield Group Mean Yield # Trials | 0.5 0.29 t/ha 3 | 1.0 0.71 t/ha 15 | 1.5 1.30 t/ha 21 | 2.0 1.76 t/ha 21 | 2.5 2.33 t/ha 35 | 3.0 2.74 t/ha 31 | 3.5 3.24 t/ha 12 |
|---|---|---|---|---|---|---|---|---|
| HyTTec Trifecta | 64 | 164 | 134 | 123 | 122 | 123 | 123 | 120 |
| Hyola Blazer TT | 35 | 141 | 122 | 116 | 120 | 122 | 122 | 119 |
| SF Dynatron TT | 39 | 149 | 126 | 119 | 119 | 120 | 120 | 117 |
| HyTTec Trophy | 109 | 156 | 130 | 120 | 117 | 117 | 117 | 115 |
| HyTTec Trident | 60 | 177 | 144 | 124 | 117 | 114 | 115 | 114 |
| InVigor T 6010 | 50 | 118 | 108 | 109 | 114 | 117 | 116 | 113 |
| InVigor T 4510 | 140 | 147 | 124 | 118 | 114 | 113 | 112 | 111 |
| Hyola Enforcer CT | 55 | 136 | 120 | 112 | 110 | 109 | 109 | 108 |
| SF Ignite TT | 124 | 103 | 101 | 103 | 110 | 114 | 114 | 111 |
| DG 670TT | 118 | 115 | 108 | 107 | 109 | 111 | 111 | 109 |
| Pioneer 44T02 TT | 62 | 139 | 122 | 111 | 103 | 99 | 99 | 101 |
| Pioneer 45T03 TT | 54 | 95 | 97 | 99 | 100 | 101 | 101 | 101 |
| ATR Wahoo | 76 | 59 | 78 | 87 | 95 | 99 | 100 | 99 |
| ATR Bonito | 112 | 78 | 87 | 94 | 95 | 96 | 95 | 96 |
| ATR Stingray | 37 |  | 83 | 91 | 93 | 95 | 94 | 94 |
| Monola H421TT | 26 | 106 | 103 | 100 | 93 | 90 | 89 | 92 |
| Monola 420TT | 35 | 82 | 91 | 91 | 88 | 85 | 85 | 88 |

Long Term GRDC NVT Australia (Mid TT) Long Term Analysis by Yield Group for regions: N/E, N/W, S/E, S/W, Lower EP, Mid North, South East, Yorke Peninsula, North Central, North East, South West, Wimmera, AgZone 2, AgZone 3, AgZone 5, AgZone 6



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## 2016-2020 GRDC NVT WA Long Term Analysed Mid TT Results expressed across Yield Groups

| GRDC NVT MID 2016-2020 Variety | Yield Group Mean Yield # Trials | 1.0 0.82 t/ha 2 | 1.5 1.29 t/ha 6 | 2.0 1.75 t/ha 11 | 2.5 2.31 t/ha 15 | 3.0 2.70 t/ha 9 | 3.5 3.25 t/ha 6 |
|---|---|---|---|---|---|---|---|
| HyTTec Trifecta | 25 | | 118 | 118 | 120 | 120 | 123 |
| Hyola Blazer TT | 9 | 111 | | 115 | 118 | 119 | 120 |
| SF Dynatron TT | 12 | 113 | 114 | 115 | 116 | 116 | 119 |
| HyTTec Trophy | 36 | 116 | 116 | 114 | 115 | 114 | 118 |
| HyTTec Trident | 20 | 123 | 122 | 115 | 118 | 115 | |
| InVigor T 4510 | 49 | 113 | 113 | 111 | 111 | 109 | 114 |
| InVigor T 6010 | 13 | | | 110 | 111 | 112 | 112 |
| Hyola Enforcer CT | 17 | 111 | 110 | 108 | 109 | 109 | 111 |
| SF Ignite TT | 46 | 100 | 101 | 107 | 109 | 112 | 109 |
| Pioneer 44T02 TT | 19 | | 111 | 104 | 103 | 100 | 106 |
| ATR Wahoo | 13 | | 89 | 95 | 97 | 100 | 94 |
| ATR Bonito | 43 | 93 | 93 | 96 | 94 | 95 | 93 |
| ATR Stingray | 15 | 91 | 91 | 94 | 93 | 94 | 92 |
| Pioneer 45T03 TT | 14 | | 99 | 100 | 100 | 101 | |
| Monola H421TT | 4 | 102 | 101 | 96 | 93 | | |
| Monola 420TT | 3 | 96 | 95 | | 89 | | |

2016-2020 Long Term GRDC NVT WA (Mid TT) Long Term Analysis by Yield Group for regions: AgZone 2, AgZone 3, AgZone 5 & AgZone 6

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GRDC NATIONAL VARIETY TRIALS

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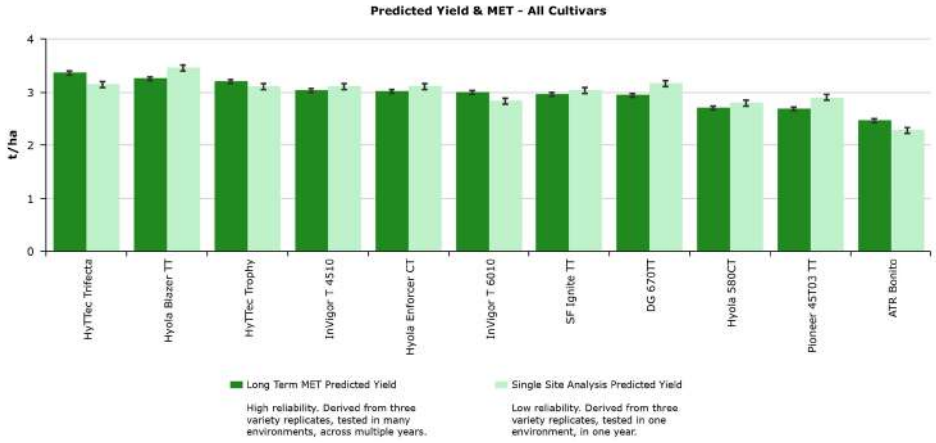
# 2020 GRDC NVT WA FEATURED INDIVIDUAL TRIAL RESULTS

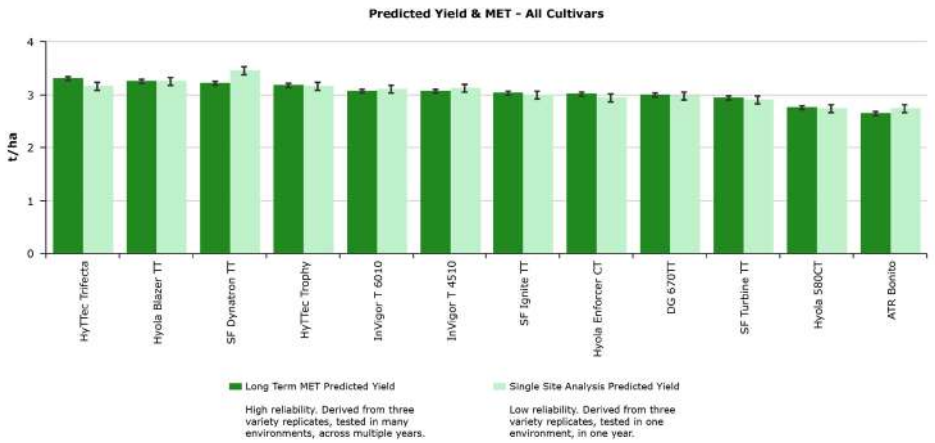
Gibson, WA - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis



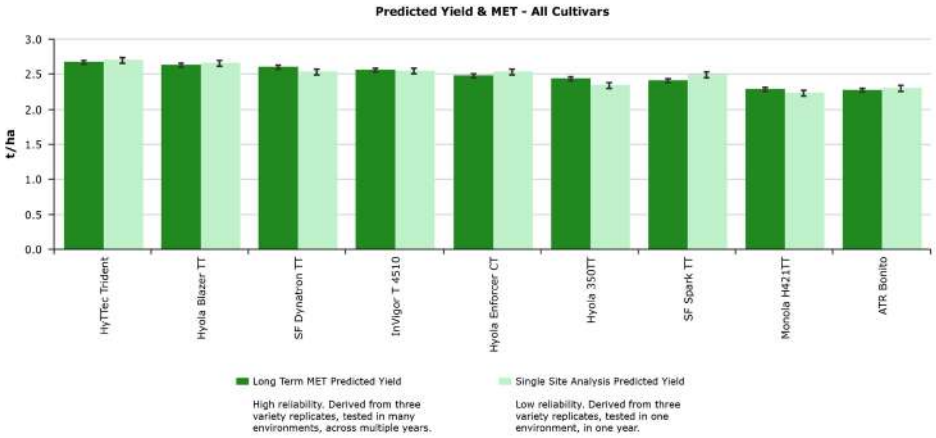

Kendenup, WA - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis




Nyabing, WA - Canola - Early Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis

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## 2016-2020 GRDC NVT NSW Long Term Analysed Mid Triazine Results expressed across Yield Groups

| GRDC NVT MID 2016-2020 Variety | Yield Group Mean Yield # Trials | 0.5 0.29 t/ha 3 | 1.0 0.69 t/ha 12 | 1.5 1.26 t/ha 8 | 2.0 1.70 t/ha 6 | 2.5 2.33 t/ha 11 | 3.0 2.72 t/ha 6 | 3.5 3.27 t/ha 3 |
|---|---|---|---|---|---|---|---|---|
| Hyola Blazer TT | 12 | 141 | | 119 | | 127 | 124 | 119 |
| HyTTec Trifecta | 19 | 164 | 138 | 129 | 130 | 126 | 126 | 120 |
| SF Dynatron TT | 13 | 149 | | 123 | | 123 | 121 | 116 |
| InVigor T 6010 | 11 | 118 | 106 | 108 | | 121 | 115 | 112 |
| HyTTec Trophy | 37 | 156 | 134 | 125 | 123 | 118 | 119 | 115 |
| InVigor T 4510 | 49 | 147 | 126 | 121 | 117 | 115 | 113 | 109 |
| HyTTec Trident | 24 | 177 | 151 | 135 | 126 | 113 | 121 | 116 |
| Hyola Enforcer CT | 15 | 136 | 123 | 116 | | 109 | 112 | 109 |
| Pioneer 45T03 TT | 16 | 95 | 96 | 98 | 100 | 102 | 101 | 101 |
| Pioneer 44T02 TT | 32 | 139 | 127 | 117 | 105 | 96 | 102 | 101 |
| ATR Wahoo | 35 | 59 | 74 | 82 | 94 | 101 | 99 | 100 |
| ATR Bonito | 44 | 78 | 84 | 90 | 92 | 97 | 92 | 94 |
| Monola H421TT | 10 | 106 | 105 | 102 | | 86 | 89 | 91 |
| Monola 420TT | 12 | 82 | 92 | 91 | | 81 | 85 | |

2016-2020 Long Term GRDC NVT NSW (Mid Triazine Long Term Analysis by Yield Group for regions: NW, SE, SW

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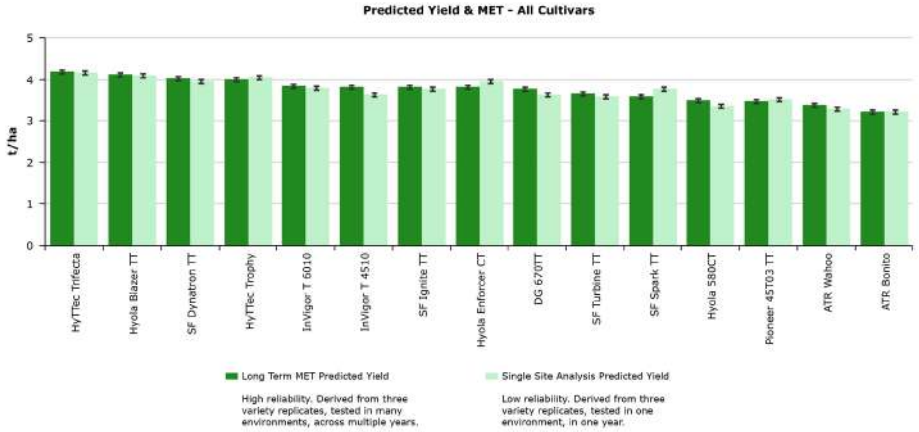
# 2020 GRDC NVT NSW FEATURED INDIVIDUAL TRIAL RESULTS

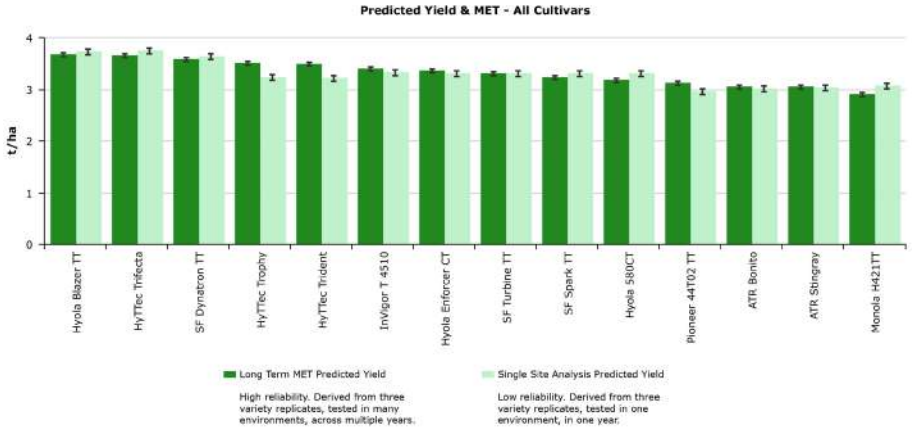
Cootamundra, NSW - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis



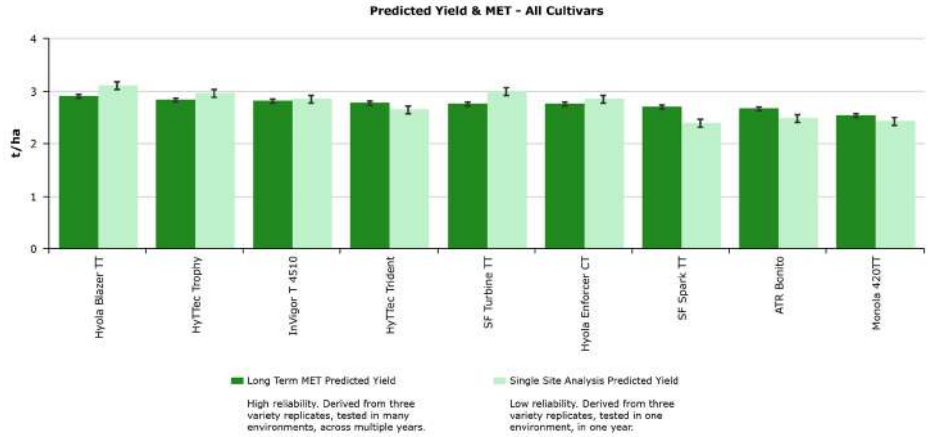

Lockhart, NSW - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis




Mullaley, NSW - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis

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## 2016-2020 GRDC NVT VIC Long Term Analysed Mid TT Results expressed across Yield Groups

| GRDC NVT MID 2016-2020 Variety | Yield Group Mean Yield # Trials | 1.0 0.80 t/ha 2 | 1.5 1.32 t/ha 4 | 2.0 1.78 t/ha 6 | 2.5 2.37 t/ha 7 | 3.0 2.77 t/ha 11 | 3.5 3.25 t/ha 4 | 4.0 3.72 t/ha 4 |
|---|---|---|---|---|---|---|---|---|
| Hyola Blazer TT | 9 | | | 116 | 123 | 122 | 120 | |
| HyTTec Trifecta | 16 | 122 | 119 | | 122 | 122 | 119 | |
| SF Dynatron TT | 12 | 122 | 120 | 116 | 120 | 119 | 117 | |
| InVigor T 6010 | 15 | 117 | 117 | 112 | 119 | 117 | 116 | |
| HyTTec Trophy | 31 | 118 | 116 | 114 | 115 | 115 | 114 | 113 |
| InVigor T 4510 | 36 | 120 | 117 | 112 | 113 | 112 | 111 | 109 |
| HyTTec Trident | 16 | 113 | 110 | 112 | 110 | 112 | 110 | |
| Hyola Enforcer CT | 15 | 109 | 107 | 107 | 108 | 108 | 107 | |
| Pioneer 45T03 TT | 15 | 100 | 101 | 100 | 102 | 101 | 101 | |
| ATR Wahoo | 19 | | 94 | 97 | 102 | 101 | 101 | |
| ATR Bonito | 24 | 100 | 100 | 97 | 98 | 97 | 98 | 97 |
| Monola 420TT | 17 | 87 | 87 | 90 | 83 | 85 | 86 | |
| Pioneer 44T02 TT | 13 | 103 | 100 | 101 | 95 | | | 97 |
| Monola H421TT | 9 | 97 | 95 | 95 | 88 | 88 | | |

2016-2020 Long Term GRDC NVT VIC Mid TT Long T Term Analysis by Yield Group or regions North Central, North East, South West, Wimmera

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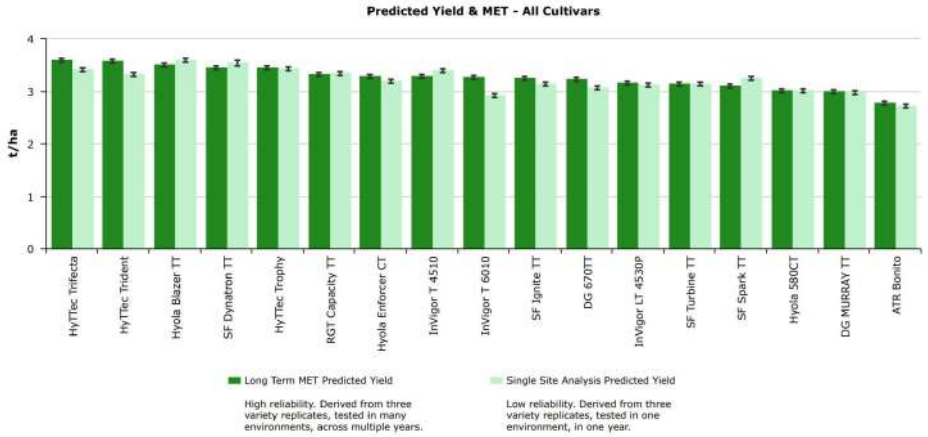
# 2020 GRDC NVT VIC FEATURED INDIVIDUAL TRIAL RESULTS

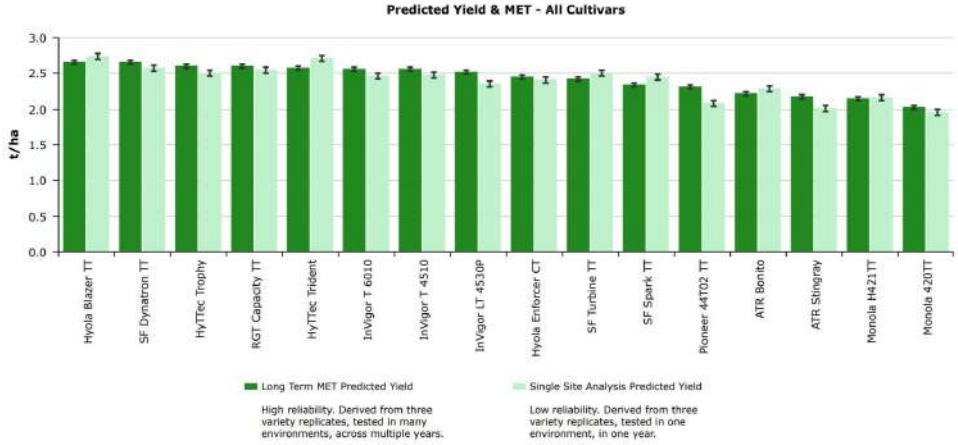
Kaniva, VIC - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis



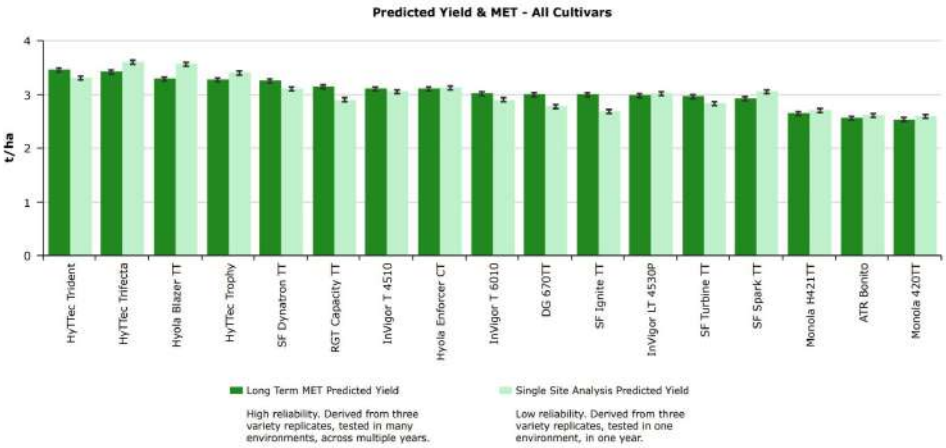

Charlton, VIC - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis




Yarrawonga, VIC - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis

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## 2016-2020 GRDC NVT SA Long Term Analysed Mid TT Results expressed across Yield Groups

| GRDC NVT MID 2016-2020 Variety | Yield Group Mean Yield # Trials | 1.5 1.30 t/ha 6 | 2.0 1.82 t/ha 3 | 2.5 2.33 t/ha 7 | 3.0 2.71 t/ha 7 | 3.5 3.36 t/ha 1 |
|---|---|---|---|---|---|---|
| HyTTec Trifecta | 12 | 120 | 123 | 120 | 124 | |
| Hyola Blazer TT | 6 | 114 | 119 | 118 | 122 | |
| HyTTec Trophy | 19 | 118 | 119 | 116 | 118 | 107 |
| InVigor T 4510 | 24 | 117 | 119 | 112 | 114 | 107 |
| InVigor T 6010 | 12 | 109 | 115 | 112 | 115 | |
| Hyola Enforcer CT | 12 | 110 | 110 | 109 | 110 | |
| SF Ignite TT | 21 | 102 | 107 | 109 | 112 | 111 |
| Pioneer 44T02 TT | 10 | 110 | 105 | 103 | 102 | 93 |
| Pioneer 45T03 TT | 10 | 99 | 100 | 100 | 101 | |
| ATR Bonito | 14 | 95 | 98 | 95 | 95 | 102 |
| SF Dynatron TT | 8 | 117 | | 117 | 120 | |
| HyTTec Trident | 11 | 121 | | 117 | 117 | |
| ATR Wahoo | 9 | | | 96 | 97 | |
| Monola H421TT | 7 | 101 | | 94 | 92 | |
| Monola 420TT | 6 | 92 | | 89 | 86 | |

2016-2020 Long Term GRDC NVT SA Mid TT Long Term Analysis across regions: Lower EP, Mid North, South East, Yorke Peninsula

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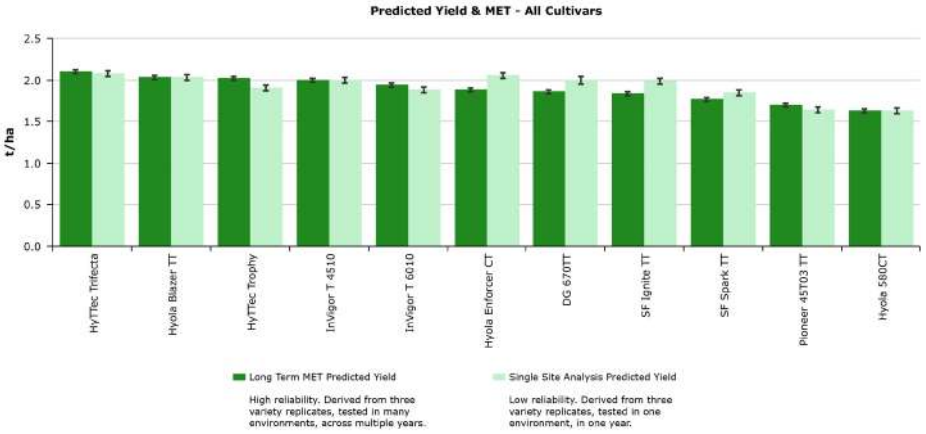
# 2020 GRDC NVT SA FEATURED INDIVIDUAL TRIAL RESULTS

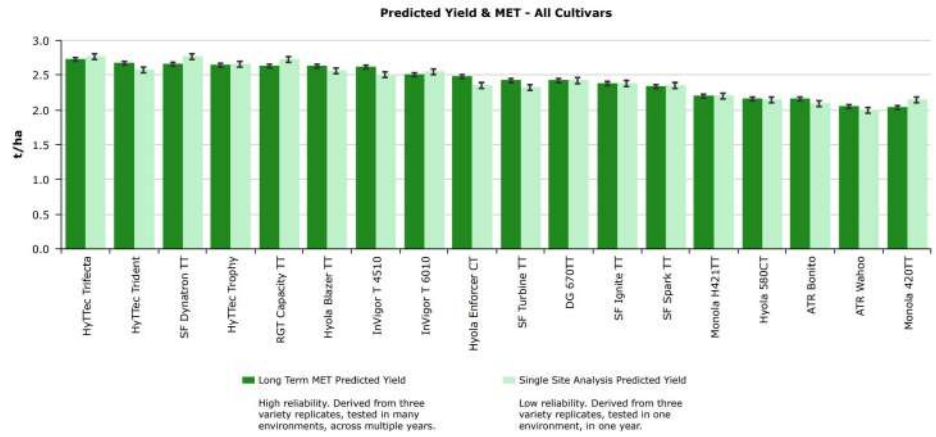
Yeelanna, SA - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis



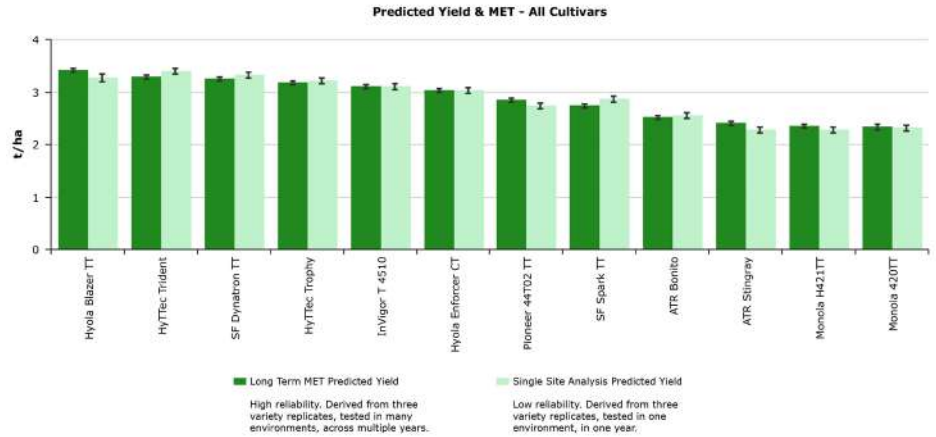

Wasleys, SA - Canola - Mid Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis




Keith, SA - Canola - Early Triazine Tolerant, 2020

## Long Term MET Predicted Yield and Single Site Analysis

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# HYOLA CT TECHNOLOGY STEWARDSHIP GUIDELINES

Pacific Seeds advocates the preservation of Australia's canola herbicide production systems through the correct selection and application of canola production systems. Part of any sustainable farming practice involves good stewardship, and adapting to new farming practices and technologies, especially with regards to integrated weed management (IWM).

Pacific Seeds also recommends that no more than two (2) Group B herbicides are applied in any four (4) year period on the same paddock as this is an important component of the Clearfield® stewardship program.

Where possible, care should be taken to avoid applications of Group B herbicides in consecutive years unless at least two years' previous good weed control has been achieved with methods other than Group B herbicides.

Pacific Seeds also encourages any person applying pesticides to keep accurate records of all herbicide usage.

To preserve the effectiveness of any herbicide a good resistance management approach is recommended. Intervix® herbicide is a Group B herbicide. Other group B (ALS inhibitors) include sulfonylureas, and triazolopyrimidines (sulphonamides).

To assist with resistance management, rotate Clearfield® winter crops with spring crops to break the cycle of winter annual weeds and allow the use of alternate site of action herbicides. If winter cropping is rotated with a fallow season, control weeds before they set seed and use alternate mode of action herbicides. ALS-inhibiting herbicides should not be used more than 2 out of 4 years.



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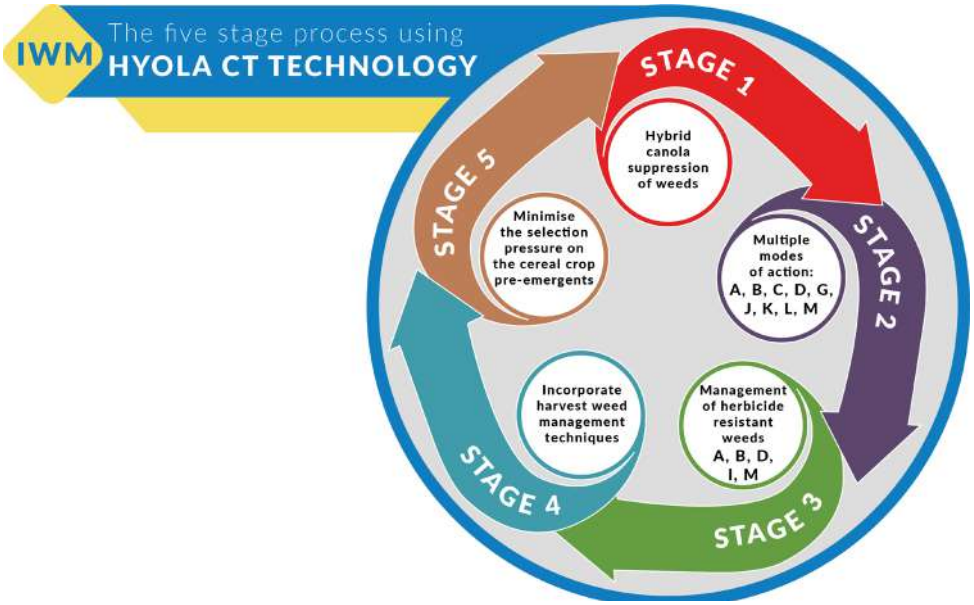
# HYOLA CT INTEGRATED WEED MANAGEMENT

When utilising the CT technology, a sound IWM strategy utilising alternative modes of action across pre-emergent, post emergent and fallow application in different crops should be adopted.

Also, the ongoing strategy should consider non-herbicide control measures such as harvest weed seed control (chaff carts, seed destructors, narrow windrow burn, chaff lining, chaff baling etc.).




Through Pacific Seeds leadership in developing new and novel canola dual herbicide tolerant technologies, we can provide growers with increased options and flexibility…"more tools in the tool box" during the canola phase of their cropping rotation.

This aligns well with the industry WEEDSMART's "The Big 6" basis for an IWM program (www.weedsmart.org.au/big-6/), which can be summarised as followed:

1. ROTATE CROPS AND PASTURES
2. DOUBLE KNOCK – TO PRESERVE GLYPHOSATE
3. MIX AND ROTATE HERBICIDES
4. STOP WEED SEED SET
5. CROP COMPETITION
6. HARVEST WEED SEED CONTROL



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