NEW

TECHNOTE 2021

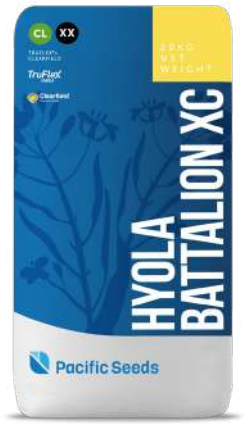
CANOLA

HYOLA BATTALION XC

XX CL **TRUFLEX® + CLEARFIELD®**

TruFlex CANOLA with Roundup Ready® Technology

Clearfield Production System



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

HYBRID ATTRIBUTES

XC stacked technology shows up to $1550/ha* value in crop protection from group B IMI soil residue (*Summer application timing)

Excellent crop protection for group B IMI soil residue management as an enhanced risk mitigation tool after low rainfall summer dry profiles

Competitive grain yields across LRZ - MRZ rainfall zones across Australian environments vs hybrids Raptor TF, InVigor R 4022P, 43Y29, InVigor R 4520P, Hyola 410XX and DG408RR

High quantitative resistance with a blackleg rating of "R" with Tri-gene groups ADF, great for rotating effective combinations of major genes

Good lodging resistance, even flowering and manageable height for direct harvesting

Yield adaptability	1.0 - 2.5t/ha
Growing Zones	LRZ - MRZ
Blackleg Rating/Groups	R - ADF (P)
Oil potential	Mod - High
Herbicide tolerance	XX + CL
Maturity	Early - Mid
*Plant vigour	8.0
Plant height	Medium
#Lodging resistance	8.5
**Shatter tolerance	8.0
^Hectolitre weight	8.0
Growing regions	NSW, SA, Vic, WA
Irrigation/dryland	Both
Alternative to	Raptor TF, InVigor R 4022P, 44Y27, 43Y29, InVigor R 4520P, InVigor R 3520, DG408RR, Hyola 410XX

(P) Indicates provisional rating and blackleg groups from Pacific Seeds blackleg nurseries and R gene screening
# Indicates observed visual rating from Pacific Seeds R&D internal replicated research trial evaluations
*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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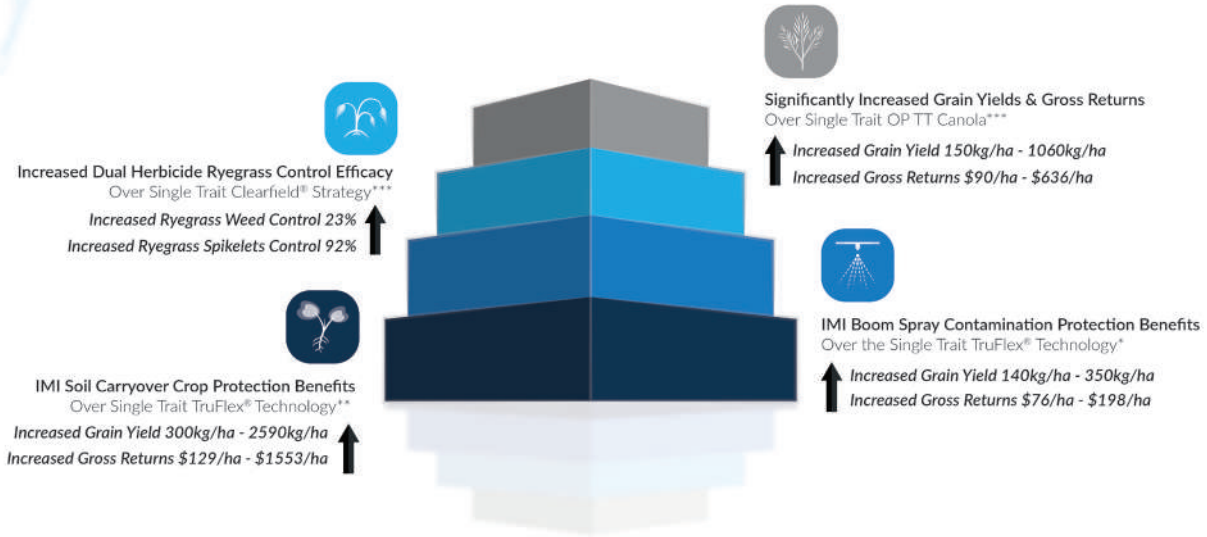
Hyola XC Technology Stacked Value

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 four environments. **Based on Pacific Seeds 2020 Replicated Technical Extension Research Trials with five different IMI chemical treatments applied in Summer, conducted over four 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 three environments.

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2020 IMI Residue Research Trials showed up to $1550 per Ha Crop Protection

XX Single Trait Technology Damaged by IMI Soil Carryover

XC Stacked Technology Protected from Group B IMI Soil Carryover

Compared to XC Technology	Summary of Treatment Results (XX 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 Trial Sites		
4MBS - High IMI Residue/XX spray - 375mL/ha Intervix®	300kg/ha to 840kg/ha	9% to 29%	$129/ha to $502/ha
4MBS - Very High IMI Residue/XX spray - 750mL/ha Intervix®	470kg/ha to 1250kg/ha	15% to 44%	$228/ha to $752/ha
4MBS - Mod-High IMI Residue/XX spray - 40g/ha OnDuty®	630kg/ha to 2490kg/ha	25% to 95%	$378/ha to $1491/ha
4MBS - Mod-High IMI Residue/XX spray - 45g/ha Raptor®	470kg/ha to 2590kg/ha	18% to 91%	$285/ha to $1553/ha
4MBS - Mod-High IMI Residue/XX spray - 70g/ha Spinnaker®	810kg/ha to 2360kg/ha	32% to 87%	$488/ha to $1418/ha

2020 Pacific Seeds Hyola XC Replicated IMI Residue Trials over four locations across Australia where Trial mean yields ranged from 1.93 – 2.78t/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® XC 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® XC Stewardship guide for specific growing guidelines www.pacificseeds.com.au/products/canola

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Hyola XC versus XX IMI + SU Herbicide Carry Over Treatment Comparisons

XX

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Low IMI Residue

Stage: Summer 4 MBS
Intervix® 375ml/ha
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High IMI Residue

Stage: Summer 4 MBS
Intervix® 750ml/ha
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High OnDuty® Residue

Stage: Summer 4 MBS
OnDuty® 40g/ha
Hasten® 500ml/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High Raptor® Residue

Stage: Summer 4 MBS
Raptor® 45g/ha
Hasten® 500ml/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High Spinnaker® Residue

Stage: Summer 4 MBS
Spinnaker® 70g/ha
Hasten® 500ml/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High Monza® Residue

Stage: Summer 4 MBS
Monza® 20g/ha
DCTrate® 2L/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

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High Logran® Residue

Stage: Summer 4 MBS
Logran B-Power® 50g/ha
Hasten® 500ml/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High Glean® Residue

Stage: Summer 4 MBS
Glean® 15g/ha
Wetter 1000 100ml/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

High Ally® Residue

Stage: 10 DBS
Ally® 5g/ha
Wetter 1000 100ml/100L
Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

Truflex® 3 Spray Strategy

Stage: IBS
Rustler® 1L/ha
Stage: Early Post Em (1-2Leaf)
RR 0.9Kg/ha
Stage: Post Em (4-6Leaf)
RR 0.9Kg/ha
Stage: 1st Flower
RR 0.9Kg/ha

Truflex® 2 Spray Strategy

Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Stage: 1st Flower
RR 1.3Kg/ha

Standard Truflex® Control

Stage: IBS
Rustler® 1L/ha
Stage: Post Em (4-6Leaf)
RR 1.3Kg/ha
Select® 500ml/ha
Stage: 1st Flower
RR 1.3Kg/ha

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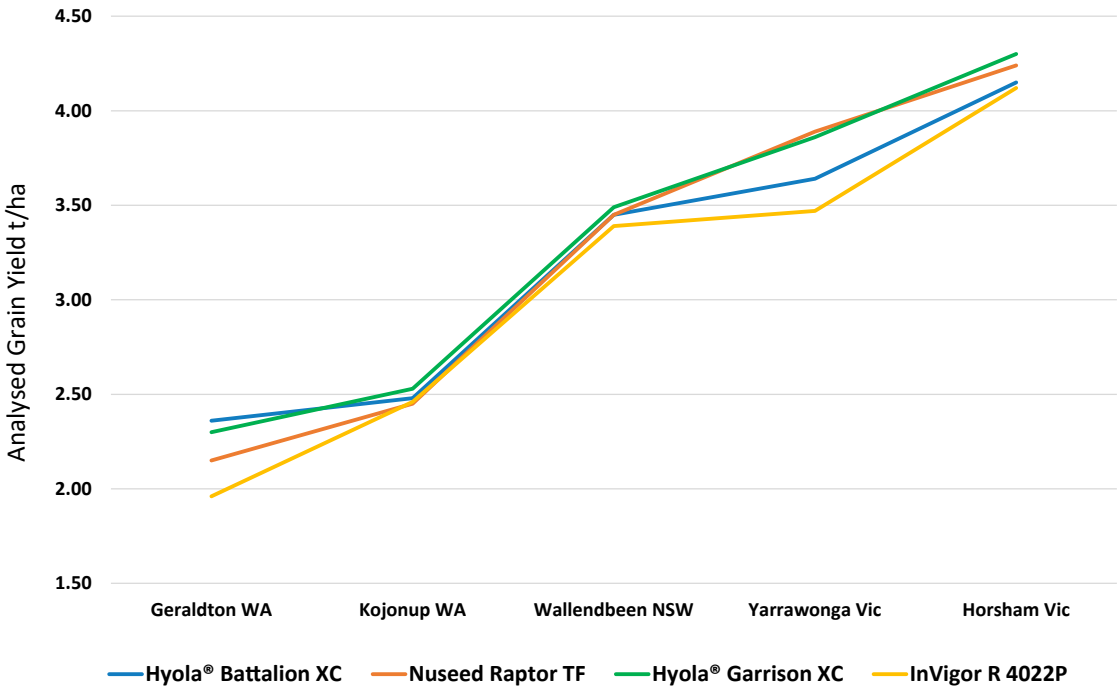
2020 Pacific Seeds Internal Company Replicated GM Canola Trial Results



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2016-2020 GRDC NVT WA Long Term Analysed Early Glyphosate Results expressed across Yield Groups

GRDC NVT EARLY 2016-2020 Variety	Yield Group Mean Yield # Trials	1.0 0.82 t/ha 4	1.5 1.30 t/ha 7	2.0 1.72 t/ha 9	2.5 2.22 t/ha 8	3.0 2.71 t/ha 3	3.5 3.28 t/ha 1
Nuseed Emu TF	10	121	127	118	120	109	
Pioneer 44Y27 (RR)	31	113	113	111	110	108	114
DG 408RR	28	106	107	105	105	103	100
Hyola 410XX	14	104	104	103	103	103	
InVigor R 4022P	14	106	103	104	103	105	
Hyola Battalion XC	8		102	101	101	100	
Hyola 404RR	24	98	101	99	100	98	89
Nuseed GT-53	16	100	100	100	100	101	103
InVigor R 4520P	14	101	98	101	100	103	
Pioneer 43Y29 RR	20	100	94	100	98	104	
Hyola Garrison XC	14	97	94	97	96	100	
Nuseed Raptor TF	11	97	94	98	97	100	

2016-2020 Long Term GRDC NVT WA (Early Glyphosate) Long Term Analysis by Yield Group for regions: AgZone 1, AgZone 2, AgZone 4 & AgZone 5

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2016-2020 GRDC NVT WA Individual Single Site Analysed Results - Featured Glyphosate Trial Locations

State	WA	WA	WA	WA	WA	WA	WA	WA
Region	Agzone1	Agzone2	Agzone2	Agzone4	Agzone4	Agzone4	Agzone5	Agzone5
Locality	Mingenew	Buntine	Yealering	Bencubbin	Kellerberrin	Merredin	Hyden	Jerramungup
Crop Type	Canola	Canola	Canola	Canola	Canola	Canola	Canola	Canola
Trial ID	CEGA20MING6	CEGA20BUNT6	CEGA20YEAL6	CEGA20BENC6	CEGA20KELL6	CEGA20MERR6	CEGA20HYDE6	CEGA20JERR6
Variety Name	tonnes/ha	tonnes/ha	tonnes/ha	tonnes/ha	tonnes/ha	tonnes/ha	tonnes/ha	tonnes/ha
Hyola Battalion XC	2.63	2.53	1.88	1.76	1.33	1.09	1.49	1.51
Nuseed Emu TF	2.94	2.50	2.31	2.23	1.76	1.32	1.86	1.72
DG 408RR	2.78	2.27	2.24	1.80	1.51	1.07	1.61	1.37
Hyola 410XX	2.55	2.45	1.87	1.89	1.36	1.10	1.67	1.54
Hyola Garrison XC	2.49	2.45	1.81	1.69	1.12	0.85	1.50	1.29
InVigor R 3520	2.61	2.10	2.07	1.73	1.51	1.07	1.40	1.35
InVigor R 4022P	2.61	2.01	2.14	1.73	1.32	0.99	1.62	1.38
InVigor R 4520P	2.39	1.78	2.10	1.72	1.24	0.87	1.63	1.42
Pioneer 43Y29 RR	2.52	2.16	1.93	1.52	1.28	0.78	1.41	1.46
Pioneer 44Y27 (RR)	2.60	2.28	2.29	2.01	1.73	1.17	1.77	1.61
Xseed Raptor	2.72	2.24	1.86	-	-	-	1.39	1.18
Site Mean (t/ha)	2.63	2.26	2.08	1.81	1.47	1.06	1.59	1.47
CV (%)	4.42	5.96	4.07	9.20	6.62	8.56	6.19	5.11
Probability	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LSD (t/ha)	0.19	0.22	0.14	0.27	0.16	0.15	0.16	0.13
AnalysisDate	20-Nov-2020	20-Nov-2020	20-Nov-2020	04-Nov-2020	20-Nov-2020	04-Nov-2020	04-Nov-2020	25-Nov-2020

2016-2020 GRDC NVT WA (Early Glyphosate) Single Site analysis by location (Selected varieties across regions: AgZone 1, AgZone 2, AgZone 4 & AgZone 5)

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2016-2020 GRDC NVT NSW Long Term Analysed Early Glyphosate Results expressed across Yield Groups

GRDC NVT EARLY 2016-2020 Variety	Yield Group Mean Yield # Trials	1.0 0.69 t/ha 2	1.5 1.30 t/ha 1	2.0 1.66 t/ha 1	2.5 2.22 t/ha 2	3.0 2.83 t/ha 1	3.5 3.03 t/ha 1
Pioneer 44Y27 (RR)	7	116	112	112	103	104	110
Pioneer 43Y29 RR	5	96	107		122	125	108
InVigor R 4022P	4		108		111	113	108
Nuseed Emu TF	3				81	80	107
InVigor R 4520P	4		105		113	115	106
Nuseed Raptor TF	3				112	113	103
Hyola 410XX	4		104		101	101	103
Hyola Garrison XC	4		101		111	112	102
Hyola Battalion XC	3				97	97	100
InVigor R 3520	8	106	101	98	92	92	100
DG 408RR	4	108	104	102			
Pioneer 43Y23 (RR)	4	106		96	89		
Hyola 404RR	5	100	96	93	91		

2016-2020 Long Term GRDC NVT NSW (Early Glyphosate) Long Term Analysis by Yield Group for regions: N/W, S/W

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Growing possibilities

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2016-2020 GRDC NVT VIC Long Term Analysed Early Glyphosate Results expressed across Yield Groups

GRDC NVT EARLY 2016-2020 Variety	Yield Group Mean Yield # Trials	1.0 0.89 t/ha 1	2.0 1.79 t/ha 4	2.5 2.06 t/ha 1	3.0 2.72 t/ha 5
Pioneer 44Y27 (RR)	11	110	107	107	107
Pioneer 43Y29 RR	6		107	106	114
InVigor R 4022P	4		106	105	109
Nuseed Emu TF	2			105	96
InVigor R 4520P	2			104	109
Nuseed Raptor TF	2			102	107
Hyola Garrison XC	4		102	102	106
Hyola 410XX	4		102	102	102
Hyola Battalion XC	2			100	98
InVigor R 3520	11	97	99	100	97
Nuseed GT-53	1				102
DG 408RR	9	101	101		100
Pioneer 43Y23 (RR)	7	94	98		94
Hyola 404RR	9	93	97		94

2016-2020 Long Term GRDC NVT VIC Early Glyphosate Long Term Analysis by Yield Group for regions: Mallee

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HYOLA XC - CROP PROTECTION BENEFITS TO GROWERS

Hyola® XC is technology is the latest in flexibility of spray timing with both quick knock down and extended residual protection available using key chemical groups that growers need. Hyola® XC technology has become a vital part in IWM soil residual carryover canola toolboxes and provide growers with inbuilt crop and investment protection.

Mixing and rotating herbicide actives in crop is now the most valuable tool in resistance management when compared to rotating over successive seasons with individual chemistries.

Visit: www.crop.bayer.com.au/tools-and-services/mix-it-up for more details.

Above: Single Trait TruFlex® Hyola XX (L) vs Dual Herbicide Stacked Hyola XC Technology (R), both with 93ml/ha simulated IMI chemistry soil carryover in 2019 agronomy extension trials (PSPE Application timing).

SOIL RESIDUAL FACTORS

Hyola XC technology can be used to overcome plantback constraints often associated with the use of Imidazolinone herbicides, particularly in low rainfall environments and/or on soils of lower pH.

Sulfonylurea (SU), imidazolinone (IMI) or triazine herbicides are likely to cause the most concern, and residues, from the previous season may affect crop emergence or even kill sensitive crops or crop cultivars in the next season.

The soil pH will have an impact on which herbicides are more likely to persist. All other things being equal, imidazolinones will be more persistent on acid soils and sulphonyl ureas on alkaline soils.

Source: www.agric.wa.gov.au/crops/grains/canola

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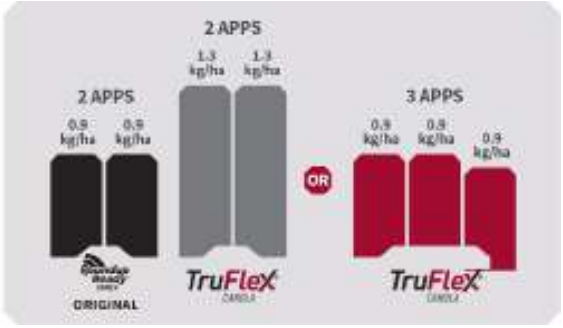
HYOLA XC - GROWER BENEFITS OF TRUFLEX TECHNOLOGY

EXTENDED SPRAY WINDOW EMERGENCE TO FIRST FLOWER

The window of application for Roundup Ready herbicide with PLANTSHIELD® by Monsanto will extend past the six-leaf stage all the way to first flower.

THE RATE FARMERS NEED FOR THEIR WEED CHALLENGES*



* Of Roundup Ready® herbicide with PLANTSHIELD® by Monsanto.
* Either apply three applications at 0.9 kg/ha or apply two applications of 1.3 kg/ha of Roundup Ready Herbicide with PLANTSHIELD® by Monsanto.

One of the smartest routes to high yield potential is through effective weed control. Here's how TruFlex® canola with Roundup Ready® Technology can help make it happen:

WEED CONTROL GROWERS CAN RELY ON

TruFlex® canola with Roundup Ready® Technology and Roundup Ready® Herbicide with PLANTSHIELD® by Monsanto were designed to work with each other. This combination provides you with the tools you need to effectively control weeds in your canola fields.

FLEXIBILITY IN SPRAY RATES AND TIMING

TruFlex canola gives you increased weed control flexibility. The window of application for Roundup Ready Herbicide with PLANTSHIELD® by Monsanto will extend past the six-leaf stage to first flower. From emergence to first flower either apply three applications at the current rate of 0.9 kg/ha or apply two higher rates of 1.3 kg/ha.

SUPERIOR YIELD POTENTIAL

New advances in trait technology will help enable better weed control and crop safety compared to Roundup Ready® canola. It's a combination that could give you the opportunity to see a lot more yield potential at harvest time.

TruFlex® CANOLA with Roundup Ready® Technology

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HYOLA XC - CLEARFIELD HERBICIDE CHEMISTRY MANAGEMENT

When utalising the XC 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.).

Clearfield canola

Apply to canola crop at the 2 to 6 leaf stage. Apply to actively growing weeds in 3-leaf to 2-tiller stage and broadleaf weeds in the 2 to 6 leaf stage. DO NOT apply **Clearfield** canola after 6 leaf stage.

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.

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

BASF We create chemistry | Clearfield Production System

Clearfield® is a registered trademark of BASF.

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