

The Handy Bt Trait Table

for U.S. Corn Production

The latest version of this document is always posted at

<https://www.texasinsects.org/bt-corn-trait-table.html>

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Most corn hybrids planted in the U.S. have transgenic traits for insect management. The Handy Bt Trait Table provides a helpful list of trait names (below) and details of trait packages (over) to make it easier to understand company seed guides, sales materials, and bag tags.

New for 2019

- ✓ Recent mergers resulted in name changes for several seed companies. While your local seed rep may have a new business card, the names of trait packages remain the same, listed alphabetically on page 2.
- ✓ *Bt Resistance* is arguably the most important issue facing growers, extension entomologists, and seed company agronomists. Problems continue to increase in regions where field failures were already found, and new cases of resistance are reported every season. To date, resistance is confirmed to all Bt toxins targeting western corn rootworm, particularly in the central corn belt. In the southern states, corn earworm and fall armyworm resistance is expanding, while Cry1F no longer controls western bean cutworm in the Great Lakes region. These species were once secondary to European corn borer in importance, but now they are of primary concern for many growers. It is critical to be up-to-date on resistance development in your local area so that you know the limitations of the Bt traits you plant.

Field corn 'events' (transformations of one or more genes) and their Trade Names

Trade name for trait	Event	Protein(s) expressed	Primary Insect Targets + <i>Herbicide tolerance</i>
Agrisure CB/LL	Bt11	Cry1Ab + <i>PAT</i>	corn borer + <i>glufosinate</i>
Agrisure Duracade	5307	eCry3.1Ab	rootworm
Agrisure GT	GA21	<i>EPSPS</i>	<i>glyphosate</i>
Agrisure RW	MIR604	mCry3A	rootworm
Agrisure Viptera	MIR162	Vip3A	broad caterpillar control, except for corn borer
Enlist	DAS40278	<i>aad-1</i>	<i>2,4-D herbicide detoxification</i>
Herculex I (HXI) or CB	TC1507	Cry1Fa2 + <i>PAT</i>	corn borer + <i>glufosinate</i>
Herculex CRW	DAS-59122-7	Cry34Ab1/Cry35Ab1 + <i>PAT</i>	rootworm + <i>glufosinate</i>
(None – part of Qrome)	DP-4114	Cry1F + Cry34Ab1/Cry35Ab1 + <i>PAT</i>	corn borer + rootworm + <i>glufosinate</i>
Roundup Ready 2	NK603	<i>EPSPS</i>	<i>glyphosate</i>
Yieldgard Corn Borer	MON810	Cry1Ab	corn borer
Yieldgard Rootworm	MON863	Cry3Bb1	rootworm
Yieldgard VT Pro	MON89034	Cry1A.105 + Cry2Ab2	corn borer & several caterpillar species
Yieldgard VT Rootworm	MON88017	Cry3Bb1 + <i>EPSPS</i>	rootworm + <i>glyphosate</i>

Abbreviations used in the Trait Table

Herbicide traits

GT *glyphosate tolerant*

LL Liberty Link - *glufosinate-tolerant*

RR2 Roundup Ready 2, *glyphosate-tolerant*

Insect targets

BCW black cutworm

CEW corn earworm

CRW corn rootworm

ECB European corn borer

FAW fall armyworm

SB stalk borer

SCB sugarcane borer

SWCB southwestern corn borer

TAW true armyworm

WBC western bean cutworm

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Trait packages in alphabetical order (acronym)	Bt protein(s) in the trait package	Marketed for control of:											Insects resistant to the combination of Bt proteins in the trait package	Herbicide trait		Non-Bt Refuge % (cornbelt)
		B C W	C E W	E C B	F A W	S C B	S C B	S C B	T A W	W C W	W C W	C R W		GT RR2	LL	
AcreMax (AM)	Cry1Ab Cry1F	x		x	x	x	x	x	x				FAW WBC	x	x	5% in bag
AcreMax CRW (AMRW)	Cry34/35Ab1											x	CRW	x	x	10% in bag
AcreMax1 (AM1)	Cry1F Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW SWCB WBC CRW	x	x	10% in bag 20% ECB
AcreMax Leptra (AML)	Cry1Ab Cry1F Vip3A	x	x	x	x	x	x	x	x	x	x			x	x	5% in bag
AcreMax TRIssect (AMT)	Cry1Ab Cry1F mCry3A	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	10% in bag
AcreMax Xtra (AMX)	Cry1Ab Cry1F Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	10% in bag
AcreMax Xtreme (AMXT)	Cry1Ab Cry1F mCry3A Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	5% in bag
Agrisure 3010 and 3010A	Cry1Ab			x				x	x					x	x	20%
Agrisure 3000GT and 3011A	Cry1Ab mCry3A			x				x	x			x	CRW	x	x	20%
Agrisure Viptera 3110	Cry1Ab Vip3A	x	x	x	x	x	x	x	x	x	x			x	x	20%
Agrisure Viptera 3111	Cry1Ab Vip3A mCry3A	x	x	x	x	x	x	x	x	x	x		CRW	x	x	20%
Agrisure 3120 E-Z Refuge	Cry1Ab Cry1F	x		x	x	x	x	x	x				FAW WBC	x	See bag tag for code	5% in bag
Agrisure 3122 EZ Refuge	Cry1Ab Cry1F mCry3A Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW WBC CRW	x		5% in bag
Agrisure Viptera 3220 E-Z Refuge	Cry1Ab Cry1F Vip3A	x	x	x	x	x	x	x	x	x	x		CRW	x		5% in bag
Agrisure Viptera 3330 E-Z Refuge	Cry1Ab Vip3A Cry1A.105 + Cry2Ab2	x	x	x	x	x	x	x	x	x	x			x	EZO NO	5% in bag
Agrisure Duracade 5122 E-Z Refuge	Cry1Ab Cry1F mCry3A eCry3.1Ab	x		x	x	x	x	x	x			x	FAW WBC CRW	x	EZ1 YES	5% in bag
Agrisure Duracade 5222 E-Z Refuge	Cry1Ab Cry1F Vip3A mCry3A eCry3.1Ab	x	x	x	x	x	x	x	x	x	x		CRW	x		5% in bag
Herculex I (HXI)	Cry1F	x		x	x	x	x	x	x				FAW SWCB WBC	x	x	20%
Herculex RW (HXRW)	Cry34/35Ab1											x	CRW	x	x	20%
Herculex XTRA (HXX)	Cry1F Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW SWCB WBC CRW	x	x	20%
Intrasect (YHR)	Cry1Ab Cry1F	x		x	x	x	x	x	x				FAW WBC	x	x	5%
Intrasect TRIssect (CYHR)	Cry1Ab Cry1F mCry3A	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	20%
Intrasect Xtra (YXR)	Cry1Ab Cry1F Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	20%
Intrasect Xtreme (CYXR)	Cry1Ab Cry1F mCry3A Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	5%
Leptra (VYHR)	Cry1Ab Cry1F Vip3A	x	x	x	x	x	x	x	x	x	x			x	x	5%
Powercore ^a	Cry1A.105 Cry2Ab2	x	x	x	x	x	x	x	x				CEW WBC	x	x	^a 5%
Powercore Refuge Advanced ^b	Cry1F															^b 5% in bag
QROME (Q)	Cry1Ab Cry1F mCry3A Cry34/35Ab1	x		x	x	x	x	x	x			x	FAW WBC CRW	x	x	5% in bag
SmartStax ^a	Cry1A.105 Cry2Ab2	x	x	x	x	x	x	x	x			x	CEW WBC CRW	x	x	^a 5%
Smartstax Refuge Advanced ^b	Cry1F Cry3Bb1															^b 5% in bag
SmartStax RIB Complete ^b	Cry34/35Ab1															
Trecepta ^a	Cry1A.105 Cry2Ab2	x	x	x	x	x	x	x	x	x	x			x		^a 5%
Trecepta RIB Complete ^b	Vip3A															^b 5% in bag
TRIssect (CHR)	Cry1F mCry3A	x		x	x	x	x	x	x			x	FAW SWCB WBC CRW	x	x	20%
VT Double PRO ^a	Cry1A.105 Cry2Ab2		x	x	x	x	x	x	x				CEW	x		^a 5%
VT Double PRO RIB Complete ^b																^b 5% in bag
VT Triple PRO ^c	Cry1A.105 Cry2Ab2		x	x	x	x	x	x	x			x	CEW CRW	x		^c 20%
VT Triple PRO RIB Complete ^d	Cry3Bb1															^d 10% in bag
Yieldgard Corn Borer (YGCB)	Cry1Ab			x				x	x					x		20%
Yieldgard Rootworm (YGRW)	Cry3Bb1											x	CRW	x		20%
Yieldgard VT Triple	Cry1Ab Cry3Bb1			x				x	x			x	CRW	x		20%