Most corn hybrids planted in the U.S. have one or more transgenic traits for insect management. These traits can increase flexibility and profitability for producers, but can also cause confusion because of varying spectrum of control or refuge requirements. The Handy Bt Trait Table provides a helpful list of trait names (below) and details of trait packages (next page) to make it easier to understand company seed guides, sales materials, and bag tags.

New for 2018
✓ Trait packages are now alphabetized, instead of grouped by seed company.
✓ To make the trait table easier to read, the “Marketed for” and “Herbicide trait” columns were redesigned to replace letter abbreviations for insect names and herbicides with a simple ‘X’.
✓ In 2017, we added a column listing insect x Bt combinations with documented field-failures, confirmed resistance, or cross-resistance in published lab assays &/or field research. For 2018, this column has the same format, but is relabeled “Resistance to a Bt protein in the trait package has developed in:”. This column is intended to alert producers and consultants to potential management problems and encourage field scouting. Growers should check with local extension educators and seed dealers to determine the status of Bt resistance in their local area. Citations for cases of resistance are posted at the web site in the header of this bulletin.
✓ Note that based on strong evidence from lab assays and the field, companies removed western bean cutworm control from the Cry1F Bt protein (i.e., the Herculex trait). Only hybrids with the Vip3A Bt protein provide reliable control of this insect. For all other hybrid packages, western bean cutworm infestations should be managed using a combination of scouting and spraying at threshold.

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

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

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
SB  stalk borer
CEW  corn earworm
SCB  sugarcane borer
CRW  corn rootworm
SWCB southwestern corn borer
ECB  European corn borer
TAW  true armyworm
FAW  fall armyworm
WBC  western bean cutworm
<table>
<thead>
<tr>
<th>Trait packages in alphabetical order (acronym)</th>
<th>Bt protein(s) in the trait package</th>
<th>Marketed for control of:</th>
<th>Resistance to a Bt protein in the trait package has developed in: *</th>
<th>Herbicide trait</th>
<th>Non-Bt Refuge % (cornbelt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AcreMax (AM)</td>
<td>Cry1Ab Cry1F</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>AcreMax CRW (AMRW)</td>
<td>Cry34/35Ab1</td>
<td></td>
<td>CRW</td>
<td>x x</td>
<td>10% in bag</td>
</tr>
<tr>
<td>AcreMax1 (AM1)</td>
<td>Cry1F Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW SWCB WBC CRW</td>
<td>x x</td>
<td>10% in bag</td>
</tr>
<tr>
<td>AcreMax Leptra (AML)</td>
<td>Cry1Ab Cry1F Vip3A</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>AcreMax TRIsect (AMT)</td>
<td>Cry1Ab Cry1F mCry3A</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>10% in bag</td>
</tr>
<tr>
<td>AcreMax Xtra (AMX)</td>
<td>Cry1Ab Cry1F Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Agrisure 3010 and 3010A</td>
<td>Cry1Ab</td>
<td></td>
<td></td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Agrisure 3000GT and 3011A</td>
<td>Cry1Ab mCry3A</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Agrisure Viptera 3110</td>
<td>Cry1Ab Vip3A</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Agrisure Viptera 3111</td>
<td>Cry1Ab Vip3A mCry3A</td>
<td>B C E F A S W T W B C R W</td>
<td>SWCB WBC</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Agrisure 3120 EZ Refuge</td>
<td>Cry1Ab Cry1F</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC</td>
<td></td>
<td>5% in bag</td>
</tr>
<tr>
<td>Agrisure 3122 EZ Refuge</td>
<td>Cry1Ab Cry1F mCry3A Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Agrisure Viptera 3220 EZ Refuge</td>
<td>Cry1Ab Cry1F Vip3A</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Agrisure Duracade 5122 EZ Refuge</td>
<td>Cry1Ab Cry1F mCry3A eCry3.1Ab</td>
<td>B C E F A S W T W B C R W</td>
<td>SWCB WBC</td>
<td>x x</td>
<td>10% in bag</td>
</tr>
<tr>
<td>Agrisure Duracade 5222 EZ Refuge</td>
<td>Cry1Ab Cry1F Vip3A mCry3A eCry3.1Ab</td>
<td>B C E F A S W T W B C R W</td>
<td>CRW</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Herculex I (HXI)</td>
<td>Cry1F</td>
<td>B C E F A S W T W B C R W</td>
<td>CEW WBC</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Herculex RW (HRXW)</td>
<td>Cry34/35Ab1</td>
<td></td>
<td>CRW</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Herculex XTRA (HXX)</td>
<td>Cry1F Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW SWCB WBC CRW</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Intrasect (YHR)</td>
<td>Cry1Ab Cry1F</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Intrasect TRIsect (CYHR)</td>
<td>Cry1Ab Cry1F mCry3A</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Intrasect Xtra (YXR)</td>
<td>Cry1Ab Cry1F Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Intrasect Xtreme (CYXR)</td>
<td>Cry1Ab Cry1F mCry3A Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>Leptra (VYHR)</td>
<td>Cry1Ab Cry1F Vip3A</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW WBC CRW</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>Powercore a</td>
<td>Cry1A.105 Cry2Ab2 Cry1F</td>
<td>B C E F A S W T W B C R W</td>
<td>CEW WBC</td>
<td>x x</td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>Powercore Refuge Advanced b</td>
<td>Cry1A.105 Cry2Ab2 Cry1F</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td>x x</td>
<td>5% in bag</td>
</tr>
<tr>
<td>QROME (Q)</td>
<td>Cry1Ab Cry1F mCry3A Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td></td>
<td>5% in bag</td>
</tr>
<tr>
<td>SmartStax a</td>
<td>Cry1A.105 Cry2Ab2 Cry1F Cry3Bb1</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td></td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>SmartStax Refuge Advanced b</td>
<td>Cry1A.105 Cry2Ab2 Cry1F Cry3Bb1 Cry34/35Ab1</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td></td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>Trecepta a</td>
<td>Cry1A.105 Cry2Ab2 Vip3A</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td></td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>Trecepta RIB Complete b</td>
<td>Cry1A.105 Cry2Ab2 Vip3A</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td></td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>TRIsect (CHR)</td>
<td>Cry1F mCry3A</td>
<td>B C E F A S W T W B C R W</td>
<td>FAW SWCB WBC CRW</td>
<td>x x</td>
<td>20%</td>
</tr>
<tr>
<td>VT Double PRO a</td>
<td>Cry1A.105 Cry2Ab2</td>
<td>B C E F A S W T W B C R W</td>
<td></td>
<td></td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>VT Double PRO RIB Complete b</td>
<td>Cry1A.105 Cry2Ab2</td>
<td>B C E F A S W T W B C R W</td>
<td>CEW</td>
<td>x x</td>
<td>a 5% b 5% in bag</td>
</tr>
<tr>
<td>VT Triple PRO c</td>
<td>Cry1A.105 Cry2Ab2 Cry3Bb1</td>
<td>B C E F A S W T W B C R W</td>
<td>CEW CRW</td>
<td>x x</td>
<td>10% in bag</td>
</tr>
<tr>
<td>VT Triple PRO RIB Complete d</td>
<td>Cry1A.105 Cry2Ab2 Cry3Bb1</td>
<td>B C E F A S W T W B C R W</td>
<td>CEW CRW</td>
<td>x x</td>
<td>10% in bag</td>
</tr>
<tr>
<td>Yieldgard Corn Borer (YGCB)</td>
<td>Cry1Ab</td>
<td>B C E F A S W T W B C R W</td>
<td>SWCB</td>
<td>x</td>
<td>20%</td>
</tr>
<tr>
<td>Yieldgard Rootworm (YGRW)</td>
<td>Cry3Bb1</td>
<td>B C E F A S W T W B C R W</td>
<td>CRW</td>
<td>x</td>
<td>20%</td>
</tr>
<tr>
<td>Yieldgard VT Triple</td>
<td>Cry1Ab Cry3Bb1</td>
<td>B C E F A S W T W B C R W</td>
<td>SWCB CRW</td>
<td>x</td>
<td>20%</td>
</tr>
</tbody>
</table>

*Check with local extension educators and seed dealers to determine the status of Bt resistance in your particular region.*