MANITOBA CROP ALLIANCE

CORN HYBRID TRAITS EXPLAINED

Hybrid selection in corn can be difficult. Seed companies provide an abundance of information on specific traits, but all this information can be overwhelming during the selection process. This document can be used as a supplemental resource during hybrid selection, when further trait information is helpful. While selecting trait packages for each field is an integral part of crop success, it is important to note that choosing a hybrid with the best agronomic traits will not necessarily result in higher yields. Choose appropriate traits based on each field's agronomic needs, manage that field properly and yield should reflect those decisions. Another useful reference is results from the Manitoba Corn Hybrid Performance Trials, available at mbcropalliance.ca.

GENETIC TRAITS

1. INSECT PROTECTION

Every corn hybrid comes equipped with traits and technologies that strengthen its ability to perform well in changing environments. In Manitoba, corn hybrids are available with the following insect protection traits to protect against economic insect pests. Integrated pest management (IPM) is an important strategy when choosing hybrids to avoid future resistance issues.

Table 1: Bt Corn Products Available in Manitoba, adapted from Canadian Bt Corn Traits Table via Canadian Corn Pest Coalition (CCPC)

TRADE NAME	KEY	BT PROTEIN	INSECT PROTECTION	REFUGE REQUIREMENT
Optimum AcreMax	AM	Cry1Ab, Cry1F	BCW, CEW, ECB, FAW	5% RIB
QROME	Q	Cry1Ab, Cry1F, Cry34/35Ab1, mCry3A	BCW, CEW, ECB, FAW, CRW	5% RIB
SmartStax RIB Complete	SS RIB	Cry1F, Cry1A.105/ Cry2Ab2, Cry3Bb1, Cry34/35Ab1	BCW, CEW, ECB, FAW, CRW	5% RIB
Trecepta RIB Complete	TRE RIB	Vip3A, Cry1A.105/ Cry2Ab2	BCW, CEW, ECB, FAW, TAW, WBC, CRW	5% RIB
VT Double PRO RIB Complete	VT2P RIB	Cry1A.105/Cry2Ab2	CEW, ECB, FAW	5% RIB
RoundupReady	RR2	N/A	N/A	
LibertyLink	LL	N/A	N/A	

Insect protection abbreviations:
BCW – black cutworm, CEW – corn earworm, CRW – corn rootworm, ECB – European corn borer, FAW – fall armyworm, TAW – true armyworm, WBC – Western bean cutworm

2. HERBICIDE RESISTANCE

a. RoundupReady Resistant to various glyphosate products (check label).

b. LibertyLink Resistant to various glufosinate 200 SN herbicides (check label).

3. MATURITY

a. **CHU — Corn Heat Units** Measurement based on daily maximum and minimum temperatures. CHU requirements should based on planting date through to physiological maturity. Geographic areas have an average CHU accumulation to refer to when choosing an appropriate CHU-rated hybrid.

b. **(C)RM — (Comparative) Relative Maturity** Not a consistent measurement between seed companies, making hybrid comparisons difficult. RM is a measurement of several factors, including harvest moisture, GDD accumulation, test weight and plant health. True relative maturity comparisons can only be made with hybrids of the same company. *Tip: If comparing maturity of hybrids between several companies, refer to harvest moisture from Manitoba Corn Hybrid Performance Trials.*

c. **Physiological CRM** Measures differences in maturity to zero milkline stage.

4. AGRONOMIC TRAITS

The following traits and ratings are determined by each seed company for their own hybrids. There is not a universal scale that is referred to when identifying each hybrid's rating. It is recommended to compare hybrids against those from the same seed company and not to compare directly against all other hybrids.

a. **Target Population** Company suggestions are based on medium- to high-yielding environments and their research results for best population range per hybrid. This is a guide for farmers to consider the environment, agronomic practices, maximum yield potential and economics.

b. **Emergence** Ability of a crop to emerge evenly and quickly under stressful conditions. An important agronomic trait when planting early and under adverse growing conditions immediately following planting.

c. **Ear Type** Fixed (determinate), semi-fixed (semi-determinate), flex or semi-flex. Fixed-ear hybrids produce a consistent sized ear regardless of plant population. Flex-ear hybrids are not rigid in dimensions and respond to changes in population and conditions.

d. **Ear Height** Low (L), medium-low (ML), medium (M), medium-high (MH), high (H). Ideal ear height may be a preference for each farmer and varies with environment and management practices.

e. **Plant Height** Short (S), medium-short (MS), medium (M), medium-tall (MT), tall (T). Preference may depend on final product; dual purpose grain-silage corn production may prefer taller hybrids and shorter hybrids may be best in fields prone to lodging or where residue management is a concern.

f. **Root Strength** Ability of the crop to prevent root or ground-level lodging.

g. **Stalk Strength** Ability of the crop to prevent stalk breakage due to disease or environmental conditions.

h. **Drought Tolerance** Ability of the hybrid to withstand drought conditions for an extended period.

i. **Greensnap** Strong rated hybrids may be chosen for fields or environments with history of greensnap.

j. **Staygreen** Refers to the plant's ability to continue transpiration and photosynthesis when it would otherwise be shutting down. This may lengthen the grain-fill period and improve standability for later-harvested fields. Staygreen may also be a beneficial quality for silage harvest, allowing the crop to stay at a given moisture content for an extended period, broadening harvest window and potentially silage quality.

k. **Dry Down** Refers to all the plant characteristics (e.g., husk number, thickness, length, coverage and tightness) that work together to enable a faster grain dry down process. Hybrids with "Excellent" rating will have fastest dry down. An early maturing hybrid is preferred in short growing regions, but dry down needs to be heavily considered for ease of harvest and potential drying costs.

l. **Test Weight** Vitreous (hard or flinty) endosperm is more dense, and therefore heavier, than floury (soft or dent) endosperm.

m. **Goss's wilt** Ability of the hybrid to resist internal spread of Goss's wilt bacterium following infection.

n. **Herbicide Sensitivity/Safety** A measure of a hybrid's tolerance to herbicide application under both ideal and adverse environmental conditions.

o. **Silage Potential** A grain hybrid's collection of characteristics that make it adaptable to silage production.