DEMaND

Developing and Educating Managers and New Decision-makers

The DEMaND series helps individuals grow in their capacity to meet the complex needs and challenges of managing a successful farm business. Whether individuals represent the transition of generations, from an employee to owner, or are new to farming, the DEMaND series offers a fresh look at farm management.

How to Read a Seed Guide (Corn Edition)

Jonathan LaPorte and Jenna Falor
Michigan State University Extension

E3430 August 2024

Raising a profitable crop begins with selecting the right seed product to plant on your farm. Seed product options are found in seed guides, available from seed companies or related seed dealers. Seed guides can be a little tricky to understand if you don't have experience reading them or if you have limited experience and switch between companies. The trickiness exists because every company sets up their guides slightly differently. For example, when reading seed guides you will notice that not all seed companies will follow the same seed numbering conventions. They may not even use the same rating scale.

While there are differences between how companies set up their seed guides, there are also a lot of common types of information. Discussed in this document are definitions and explanations of the types of information you will likely find mentioned across most corn seed guides. Each section will also highlight the importance of making sure you read to understand without making assumptions about seed guide information. We'll also review how costs and harvest factors are important considerations in selecting seed options for your farm.

Contents

Let's Start With The Numbers

Hybrid numbering systems are the conventions by which companies name their different corn hybrids. These conventions may use a combination of abbreviations for their company name, relative maturity (RM) numbers, and possibly trait information to identify hybrids.

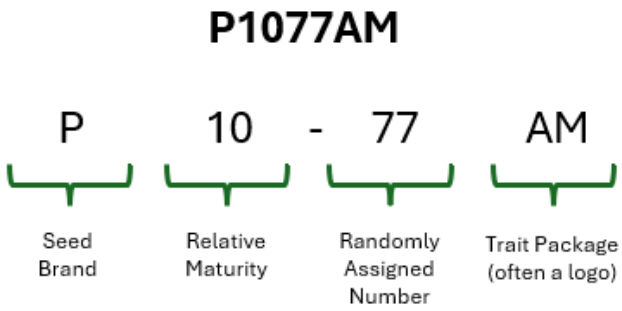

Figure 1. Explanation of corn hybrid numbering from Pioneer Hybrids brand seed. Photo by Jon LaPorte, MSU Extension.

Pioneer for example, will always start with a P for Pioneer, followed by two numbers for the comparative relative maturity. Relative maturity will be further explained in the next section. The relative maturity is often shortened to the last two numbers, followed by two random numbers and finally there may be letters at the end for particular traits. An example would be P1077AM which is a 110 day relative maturity corn hybrid (Figure 1).

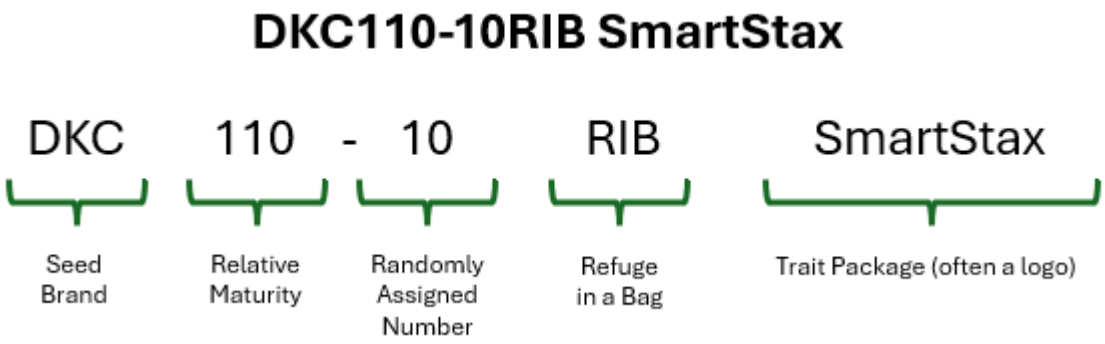

Figure 2. Explanation of corn hybrid numbering from DeKalb brand seeds. Photo by Jon LaPorte, MSU Extension.

DeKalb will always start with DKC followed by the next two numbers also representing relative maturity. However, in some cases the numbers may refer to RM minus 50, while some of the newer hybrids may list the RM itself. An example would be DKC110-10RIB which is a 110 day relative maturity corn hybrid (Figure 2).

The point of these examples is to show that you can't assume that all seed companies have the same numbering systems. If you are looking at different seed brands, make sure to look at the information provided and understand the numbering system that the company uses.

An additional characteristic of a numbering system may be how trait packages are listed. In Figure 1, the hybrid number includes the letters AM, which stands for AcreMax. In Figure 2, the hybrid number includes the letters RIB and also the word or logo of SmartStax. AcreMax and SmartStax refer to traits within the plant that are designed to protect against insect damage. These are trademark names of traits for controlling specific types of insects. Planting hybrids with traits to control insects requires a portion of the field to be planted to hybrids without those traits, called refuge. Refuge helps to slow down the build-up of insect resistance to traits. Refuge in a bag (RIB)

allows you to comply with refuge requirements more easily, because non-traited corn is already included in each bag. More information on traits will be provided in the “Identify Desired Characteristics” section of this publication.

Another thing that will vary by company within seed guides is their rating system. The company agronomist determines these rating systems. In one case it may be a 1-9 rating system, with 1 being the best rating for another company. The same 1-9 rating system may have 9 as the best rating for a separate company. Other companies will use more descriptive terms such as poor, good, very good, and excellent. Again, it is important to understand which rating scale the company is using to ensure you are buying what you mean to. A helpful tip when reviewing a scale is to identify if any hybrid ranks are listed with a lower number. Often, you won’t see many products that rank at the lowest number on the scale being used. Those hybrid options are usually weeded out during the development phase and never make it to a commercial release. If you see a hybrid with a lower number ranking, it is likely an indicator of the scale being used but you should confirm this within the guide.

Corn 101

Corn seed for commercial planting are normally F1 hybrids created from two parent plants. The goal is that a hybrid will take on the best attributes of both parent plants and perform in a consistent manner. However, sometimes less desirable attributes may still be present as well. These mixtures of different characteristics are what make seed selection both important and challenging.

You’ll need to identify characteristics important for a successful corn crop on your farm. Just as no two farms are exactly alike, neither are the fields in which you’ll be planting. You need to understand the field conditions and potential environment you expect a corn plant to grow in; then select hybrids that meet those expectations.

A common starting point to identify a corn hybrid is by when they will reach maturity. However, before opening a seed guide, you need to think about how you define when corn has reached maturity. Many seed guides will list maturity by two terms: relative maturity (RM) and growing degree days (GDDs). Relative maturity focuses on harvest maturity, while growing degree days focus on physiological maturity. Let’s explore the differences.

Relative Maturity (RM)

Relative maturity is known as the days needed to reach harvest maturity. Harvest maturity is when grain can be harvested with minimal loss or kernel damage. Under ideal field conditions, harvest occurs when corn has naturally dried to a grain moisture content of 25% or lower. However, weather can impact how long it takes to reach ideal moisture levels. Temperature, humidity and water availability can delay or speed up the drying process. With weather as an important factor, relative maturity days should not be considered the same as calendar days from planting (Figure 3).

A hybrid’s relative maturity is defined based on comparison to an established “standard” hybrid. The process begins with a comparison of grain moisture

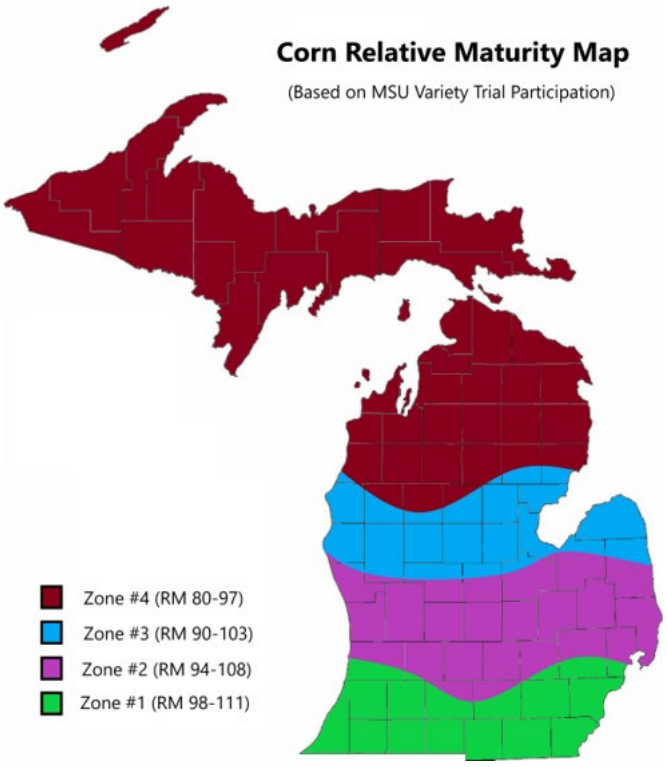

Figure 3. Corn relative maturity map based on MSU variety trial participation data. Photo by Jon LaPorte, MSU Extension.

content between both hybrids at harvest maturity. For example, the grain moisture content of a new hybrid is two percentage points higher than the standard hybrid.

An assumption is then used that corn will lose 0.5 percentage points of grain moisture per day under ideal field conditions. Therefore, it would take two days to lose one percentage point (1 ÷ 0.5 = 2).

At two percentage points higher than the standard hybrid, a new hybrid would need four additional days to reach harvest maturity (2 ÷ 0.5 = 4). The additional days are then added to the standard hybrid's relative maturity. If a standard hybrid's relative maturity is 102, a new hybrid's relative maturity would be 106.

Bob Nelson, professor emeritus of agronomy at Purdue University, provides a more detailed outline of this process in his article Interpreting Corn Hybrid Maturity Ratings (https://www.agry.purdue.edu/ext/corn/news/timeless/hybridmaturity.html).

Seed selection based solely on relative maturity should include reviewing harvest conditions, access to equipment and drying capabilities - especially in situations where you custom hire your harvesting or have limited drying capacity on-farm. Added costs and delays during adverse harvest conditions can reduce potential benefits of some hybrid options.

Note: A common misconception is that a hybrid with a higher relative maturity will have a higher yield potential than lower relative maturity hybrids. The reason it may seem this way is because the "full season" hybrids often have longer heat unit accumulation and are typically grown where there are more GDDs in the growing season. Heat units and relative maturity are often correlated in seed options, but not a guaranteed combination on each available hybrid.

Growing Degree Days (GDDs)

Heat can strongly influence how fast or slowly corn develops and reaches physiological maturity. **Growing degree days** are the thermal accumulation, or heat units, needed to reach physiological maturity from planting (Figure 4). Physiological maturity is when a black layer forms near the tip of a corn kernel. The black layer signals that a corn kernel's development has stopped and is no longer taking in water or plant sugars.

The black layer can be formed prior to reaching a desired harvestable moisture - making physiological maturity possible prior to harvest or relative maturity. Because of the focus on heat units, it is possible for hybrids with different relative maturities to have the same expected GDDs. Therefore, hybrids with a lower RM can equal or exceed yields of a higher RM option with similar GDDs, depending on growing conditions.

Seed companies may list GDDs as an actual number or grouped together in categories. For example, early maturity hybrids may list 2,500 GDDs, while late season maturity hybrids may list 2,800 GDDs.

Understanding the typical range of growing degree days in your area is important for seed selection. The goal should be to select hybrids that will reach physiological maturity prior to a severe or "killing" frost.

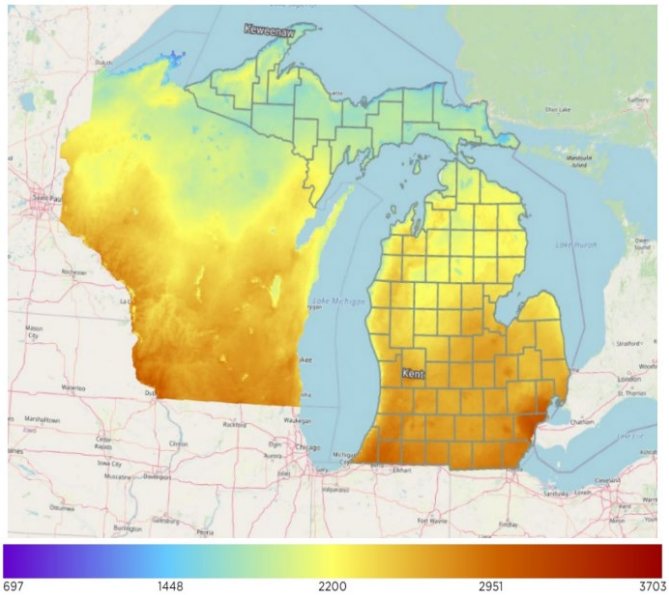

Figure 4. Cumulative Growing Degree Days (50F) from 1991-2020 from MSU Enviroweather. Photo created by Jon LaPorte, MSU Extension per data map creator at MSU Enviroweather.

Choosing a hybrid with GDDs within your region's normal range minimizes potential harvest loss. To review GDDs in your area, visit [MSU's Enviroweather website](https://enviroweather.msu.edu/weathermodels/growingdegreedays) (https://enviroweather.msu.edu/weathermodels/growingdegreedays).

Identify Desired Characteristics

Seed guides offer information on a number of different plant attributes including growth factors that focus on plant health and survivability, harvest condition and quality of grain, tolerance or safety concerns when using herbicides, and even disease resistance or susceptibility. All of these are important when considering the field conditions of your farm.

Growth Factors

Plant health is a key consideration when selecting a corn hybrid for your farm. From planting to harvest, growth expectations will largely determine if a corn plant can produce a quality, harvestable ear.

Emergence is how quickly and uniformly a plant surfaces from the soil. Ideally, all planted seeds will sprout and emerge together. Uniformity keeps growth stages evenly across a field and impacts nutrient, pesticide, and even water applications. Inconsistent emergence means delayed plants won't have a fully mature ear by harvest time. Delayed plants in silage corn (high moisture corn preserved for forage) may still add tonnage but have lower feed energy. Emergence can also be a factor in planting date decisions. Hybrids with poor emergence need consistent temperatures above 50^{o}F and sufficient moisture to surface uniformity.

Seedling vigor refers to a seedling's ability to grow under less-than-ideal conditions. Cool temperatures, excess soil moisture, and even drought can have negative impacts on young plants - impacts that can carry forward into later growth stages.

Root strength is how strong a plant's root system is to keep it upright. In order for a plant to grow and survive to harvest, it needs to have a sturdy base to grow from; sometimes grouped with stalk strength and referred to as standability.

Root type refers to whether a plant's roots are penetrating, fibrous, or modified. *Penetrating* roots move further through the soil and are ideal for poorly drained soils. *Fibrous* roots provide a broader footprint near the soil surface and are ideal for coarser soils that don't hold water well. *Modified* roots are a newer term used by some seed companies. It refers to a root system that has a mixture of penetrating and fibrous attributes.

Stalk strength focuses on how strong a plant's stalk is through the season. Sturdy stalks can support corn ear growth, withstand strong winds from adverse weather, and stand longer in delayed harvest conditions. It is the other half of a standability rating.

Greensnap is a condition where rapidly growing stalks become brittle, leading to concerns about their ability to withstand strong winds from adverse weather (storms, high winds). Better ratings indicate less risk of stalk snapping in adverse weather conditions.

Plant height refers to whether a plant is tall, medium, or short. *Tall* plants are often more desirable for silage fields as they have more stover (leaves and stalk). Soils made up of highly decomposed organic materials, or muck, can also favor tall plants. Muck soil typically has higher nitrogen availability and water holding capacity. Taller plants often benefit from higher nutrient uptake and more sunlight capturing potential. However, micronutrients may be a limiting factor. *Medium* size plants are ideal for grain fields where lodging is less of a concern. Medium plants can also be a decent option for silage if ideal conditions lead to better yields with more stover, or if you want a higher grain-to-stover ratio in your silage. *Short* plants are often more desirable for grain fields where lodging is a concern or less stover is ideal.

Comments on muck soils in this section provided by Maninder Singh, Michigan State University.

Leaf type refers to whether leaves are upright, semi-upright, or pendulum. *Upright* is when all leaves are vertical or pointing upwards, often ideal for planting hybrids in higher populations where available sunlight may be more limited. *Semi-upright* leaves are pendulum at or below the ear, while the rest of the plant leaves are upright. *Pendulum* leaves flop over and run parallel to the ground like a solar panel. They are ideal for lower planting populations where more available sunlight can be captured (Figure 5).

Figure 5. Corn plant with pendulum leaves. Photo by Jon LaPorte, MSU Extension.

Note: Leaf type is often tied to whether a plant has fixed or flex types of ears. More information on fixed versus flex ear characteristics can be found in the population density section.

Staygreen is a condition where plants continue transpiration and photosynthesis longer into a growing season. *Transpiration* is the movement of water from a plant's roots up to its leaves. *Photosynthesis* is where plants use sunlight to create food from carbon dioxide and water. Longer periods of both processes can effectively extend the grain-fill period and possibly improve standability, which is ideal for silage.

Drought tolerance is how well a plant handles abnormally dry conditions in a growing season. Corn is sensitive to a lack of water, but a higher tolerance can help withstand short, dry periods with limited impact on yields. See the Generic Traits section for information on drought tolerant traits.

Ear height or placement is a reference to whether corn ears are low, medium, or highly placed on the plant. If ears are too low; they may be difficult to harvest. If ears are too high, plants may become top heavy and susceptible to lodging. Field conditions, management concerns and your own personal preferences are important factors when considering ear height or placement.

Husk cover refers to whether the ear husk is short, medium or long. A *short* husk doesn't cover the tips of the ear, which makes it more prone to disease. However, a shorter husk does provide for faster drydown to harvest maturity. A *medium* husk is more likely to cover the ear but may still have visible tips and need additional disease protection. Disease ratings are an important consideration on hybrids with medium husks. A *long* husk covers the entire ear in ideal conditions and has better disease prevention, but ears tend to have slower drydown.

Note: Growing season conditions can also impact husk coverage. Better conditions could elongate the husk if there is a larger ear, while poor conditions can lead to underdeveloped tissue growth and smaller ears.

Cob color is simply whether the ear's corn cob is red or white. The coloration is based purely on genetics and research has not shown any effects to yield, disease resistance or other management concerns.

Harvest Factors

Harvestability is another important factor when reviewing a seed guide. From drydown to test weight and even harvest appearance, the condition of the plant at harvest can impact quality and potential revenues.

Drydown is how quickly the ear dries to a harvestable moisture. Ear and husk characteristics are key impacts on a rating scale.

Test weight is a measurement of the density of corn kernels. A better rating means a likelihood of denser kernels and better harvest quality under ideal conditions. Denser kernels weigh heavier and can lead to high yields, since less kernels are needed to equal a bushel.

Harvest appearance refers to how intact a plant still appears as it reaches maturity and into the harvest period: the plant doesn't look as though it is falling apart and still has much of its leaves or even its tassel present.

Pesticide Use and Disease Ratings

Each seed guide lists several diseases and a plant's susceptibility towards them. A better rating indicates the plant is less susceptible to disease development and injury, while a lower rating indicates higher susceptibility and the greater potential for yield loss. A lower disease resistance may also require additional pesticide use in the form of fungicides for fungal diseases.

Diseases listed in a seed guide include those that can cause leaf (foliar) or ear damage. In both cases, yields are reduced as ear kernel quality is reduced (directly or indirectly) and in the case of ear rots, the production of mycotoxins harmful to livestock and humans can form. Martin Chilvers from Michigan State University outlines important corn disease management decisions (www.canr.msu.edu/news/corn_disease_management_decisions) as well as techniques for scouting. Chilvers outlines that the main foliar diseases in Michigan are Tar Spot, Northern Corn Leaf Blight and Gray Leaf Spot. Primary ear mold concerns for Michigan growers are Gibberella and Fusarium. For more information on Tar Spot, review: www.canr.msu.edu/news/managing-tar-spot-in-corn.

When reviewing disease ratings, an important consideration is the impact of diseases on overall yields. A common question is how much leaf tissue can be impacted by disease before it affects yields? In a follow-up interview, Chilvers indicates that it depends on the growth stage of corn and the particular disease. When asked about placement of tissue damage, he states that disease below the ear leaf is likely to have minimal impact, but growth stage is important to that as well. Diseases are measured over time, so a lot of disease presence at the very end of the season will have little impact. While moderate disease early and continuing through the season is likely to have a greater impact.

While a higher disease rating can limit impacts to plant health and yield, fungicides may still be needed if environmental conditions favor disease presence or injury. Chilvers adds that although a lot of data is not available on each disease, a general rule of thumb is that there is a higher chance of return on investment (ROI) when using fungicides if disease pressure is at 5% or greater.

To learn more about corn diseases and management tips, visit the Crop Protection Network (https://cropprotectionnetwork.org/). For more information on calculating a ROI on fungicide use, visit Crop Protection Network's Corn Fungicide ROI Calculator (https://cropprotectionnetwork.org/fungicide-roi-calculator).

Comments in this section provided by Martin Chilvers, Michigan State University.

Plant safety and tolerance to pesticide application can also be listed in a seed guide. Pesticides are used not only for diseases, but also for weed and insect suppression or prevention as well. Herbicides in particular may cause plant damage even at labeled use rates. Tolerance is usually listed as acceptable, caution, or warning. *Acceptable* ratings indicate crop injury is unlikely. *Caution* indicates crop injury is possible if adverse environmental conditions are present. *Warning* indicates crop injury will occur even with good environmental conditions.

Genetic Traits

In addition to pesticide use and disease ratings, corn hybrids may be genetically modified with additional management attributes. When a plant is modified and its resistance is not naturally occurring this is referred to as genetically modified organisms (GMOs) or simply "traits," plants are able to provide their own protection against pests, injury from pesticides, or environmental stress conditions.

Insect traits refer to genetic attributes within a plant that act as an insecticide. For example, Bt traits prevent some insects from creating essential proteins after feeding on plant tissues. Without the proteins, the insects eventually will die. Examples of insect traits include SmartStax, Double Pro, Trecepta, Viptera, Duracade, Agrisure, and varying types of AcreMax options. *Note: even with genetic traits, environmental conditions in a growing season may still require additional insecticide use to manage pest populations.*

Herbicide traits refer to genetic attributes that allow a plant to detoxify herbicide active ingredients. Once detoxified, herbicides are considered inert within a plant's metabolism and will not harm plant tissue. Weeds that do not have the same ability to detoxify active ingredients will be susceptible to injury. Examples of herbicide traits include Roundup Ready, Enlist and Liberty Link.

A major concern with genetic traits is the potential for pests to become tolerant or resistant to them. Refuge areas are required to prevent the buildup of insect resistance. These areas are planted to corn hybrids without genetic traits to allow some insects to survive. To prevent weed resistance, use of herbicides with multiple modes-of-action or methods of herbicide interaction within a plant to cause damage are recommended. Some insect traits are also offered with multiple modes-of-action to further reduce resistance buildup. For more information on genetic traits and refuge areas, visit the Bt Corn Trait Table (Figure 6) (https://www.texasinsects.org/bt-corn-trait-table.html).

The Handy Bt Trait Table for U.S. Corn Production — Version: March 2024

Currently available trait packages, A-Z (alternate name)	Bag tag code	Proteins in package ********** Font type denotes target: caterpillar or *rootworm*	Marketed to control: BCW	CEW	ECB	FAW	SB	SCB	SWCB	TAW	WBC	CRW	Species w/ resistance to all Bts in package	Refuge, northern states (higher in south)	Herbicide tolerance (? = check the bag tag)
AcreMax	AM	Cry1Ab Cry1F	x	x	x	x	x	x	x				CEW FAW WBC	5% RIB	GLY LL
AcreMax1	AM1	Cry1F *Cry34/35Ab1*	x		x	x	x	x	x			x	ECB FAW NCR SWCB WBC WCR	10% RIB 20% ECB	GLY LL
AcreMax Leptra	AML	Cry1Ab Cry1F Vip3A	x	x	x	x	x	x	x	x	x			5% RIB	GLY LL
AcreMax Xtra	AMX	Cry1Ab Cry1F *Cry34/35Ab1*	x	x	x	x	x	x	x			x	CEW FAW NCR WBC WCR	10% RIB	GLY LL
AcreMax Xtreme	AMXT	Cry1Ab Cry1F *Cry34/35Ab1 mCry3A*	x	x	x	x	x	x	x			x	CEW FAW WBC WCR	5% RIB	GLY LL
Agrisure 3000GT	3000GT	Cry1Ab *mCry3A*		x	x			x	x			x	CEW WCR	20%	GLY LL
Agrisure 3010 (Agrisure GT/CB/LL)	3010	Cry1Ab		x	x			x	x				CEW	20%	GLY LL
Agrisure Above (Agrisure 3120EZ) AA Refuge Renew (Agrisure 3120)	AA	Cry1Ab Cry1F	x	x	x	x	x	x	x				CEW FAW WBC	EZ: 5% RIB Renew: 5%	GLY LL?
Agrisure RW or GT/RW	?	*mCry3A*										x	WCR	20%	GLY (if GT)
Agrisure Total (Agrisure 3122EZ) AT Refuge Renew (Agrisure 3122)	AT	Cry1Ab Cry1F *Cry34/35Ab1 mCry3A*	x	x	x	x	x	x	x			x	CEW FAW WBC WCR	EZ: 5% RIB Renew: 5%	GLY LL?
Agrisure Viptera 3110	3110	Cry1Ab Vip3A	x	x	x	x	x	x	x	x	x			20%	GLY LL
Agrisure Viptera 3111	3111	Cry1Ab Vip3A *mCry3A*	x	x	x	x	x	x	x	x	x	x	WCR	20%	GLY LL
Duracade (Agrisure 5122EZ) D Refuge Renew (Agrisure 5122)	D	Cry1Ab Cry1F *eCry3.1Ab mCry3A*	x	x	x	x	x	x	x			x	CEW FAW WBC WCR	EZ: 5% RIB Renew: 5%	GLY LL?
Duracade Viptera (Agrisure 5222EZ) DV Refuge Renew (Agrisure 5222)	DV	Cry1Ab Cry1F Vip3A *eCry3.1Ab mCry3A*	x	x	x	x	x	x	x	x	x	x	WCR	EZ: 5% RIB Renew: 5%	GLY LL?

Figure 6. Excerpt of The Handy Bt Trait Table by Chris DiFonzo, Michigan State University. https://www.texasinsects.org/bt-corn-trait-table.html

When reviewing hybrids with genetic traits for pests, always identify historical or potential pests in your field locations. Genetic traits can add cost to seed purchases. If pests targeted by genetic traits are not concerns for your farm, consider potential cost savings by looking at other hybrid options.

Drought tolerance is another type of trait available for corn hybrids. Stress brought on by drought can cause many plant functions needed for growth and development to stop working. Drought traits are designed to improve how long normal plant functions can continue during periods of low moisture. The longer that plant functions can continue, the less reduction in yield can be expected. Just like insect and herbicide traits, there are differences between the types of drought traits available. Some traits are genetically modified drought genes inserted into the plant. While other traits may be hybrid lines bred for improved drought tolerance, such as improved root systems or ear silk emergence. Examples of drought traits include Artesian, AQUAmax, Optimum, and DroughtGard.

Intended Use Ratings

Seed guides often focus information around selling corn as commercial grain. However, seed companies recognize that additional or specialized markets are available to growers (organic, ethanol, feed). Some seed companies provide basic information on these markets, such as a label (silage, silage ready, organic). While other seed companies have begun to provide more detailed information, especially when it comes to feed use. Examples include starch content, milk pounds per ton and stover tons per acre.

If you sell your corn in a market not listed within the seed guide, contact your local seed dealer to find out if information is available. As farms continue to look at market opportunities, information on hybrids that may be suited for existing and new markets will continue to become more readily available.

Population Density (Planting Rates)

Population density in a field is important to your decision when selecting corn hybrids. Depending on growth factors, soil types and environmental conditions, higher or lower planting rates may be needed for a specific hybrid. In some cases, hybrids may be versatile and can be planted at different planting rates, depending on environmental conditions. Ultimately, you need to know the population options that go along with a potential hybrid purchase.

Figure 7. An example of a semi-fixed ear of corn. Photo by Jon LaPorte, MSU Extension.

Some seed guides will help by listing recommended planting populations with their hybrid options. These recommendations can indicate where each hybrid is best suited. For example, a higher planting population would indicate the hybrid will work on well-drained soils with high water holding capacity or irrigation. In most cases, seed guides offer guidance on planting populations by listing the hybrid's ear type. Categorized as either flex, fixed, semi-fixed or semi-flex.

A **flex or in-determinate** ear will produce longer and wider diameter rows of kernels in favorable environmental conditions. Hybrids with flex ears often have sturdy stalks with greater root development and larger open leaves to better utilize photosynthesis. Flex ear hybrids perform best at lower populations where competition for water and nutrients is reduced between plants. Flex ear hybrids are not as common today but are still available from some seed companies. Most options today focus on fixed or semi-fixed ear hybrids.

A **fixed or determinate** ear will have the same length and diameter of kernel rows regardless of environmental conditions. Hybrids with fixed ears often have reduced root mass, decreased stalk size and more upright leaf structures. These growth factors make them ideal for higher planting populations, which can lead to higher yield potential. Fixed ear hybrids are ideal for irrigated, tiled, or higher water holding capacity soils (clay).

A **semi-fixed or semi-determinate** ear is similar to a fixed ear but may produce a longer row of kernels (Figure 7). Semi-fixed hybrids are best suited on well-drained soils with moderate water holding capacity (silt or silt loam).

A **semi-flex** ear is similar to a flex ear, but kernel row lengths are more determined like fixed ear hybrids.

Reading the Guide and Selecting Some Options

Identifying local conditions and what you need from a corn hybrid is key to successful seed selection. Understand the difference in weather patterns, field conditions, intended uses, and potential pest or environmental concerns. Outline the criteria you need corn hybrids to meet before opening a seed guide. Knowing your criteria helps you to select potential options that meet your needs.

Once you've selected some options, review corn variety trial information across multiple locations. Variety trials are a great source of information when comparing hybrid seed options. Listed by relative maturity and GDDs, you can identify which corn hybrids are consistent performers. Most importantly, trials can provide an idea of what hybrids have or may perform well in your area. Trials are conducted by universities, seed dealers and sometimes even local farms. Contact your local seed dealers for the latest in variety trial information.

Identifying the Cost of Seed Selection

But wait, there's still one more step in the seed selection process. Once you've identified the top performers, the final step is to identify the costs of those potential hybrids.

Cost Per Bag vs. Cost Per Acre

Identifying seed costs begins with knowing the price of an individual hybrid. Seed is sold in fairly standardized units regardless of packaging (bag, tote, or box). For corn, seed is sold in equivalent per bag units or 80,000 kernels per bag. The use of price per bag information is your first comparison point between hybrid options.

For example, a seed box may contain four million kernels of seed corn or 50 bags at 80,000 kernels per bag. If the price per bag of an individual hybrid is valued at $300. To find the cost of the seed box, multiply the price per bag of the individual hybrid by 50 bags. Therefore, $300 x 50 = $15,000.

The second comparison between hybrids is the trait packages. Some hybrids you'll consider will have identical traits (insect and herbicide). While some hybrids will only offer certain traits (herbicide only). Understanding what traits are offered helps to differentiate between hybrids and their potential value to your farm.

Table 1. Example comparison of corn hybrids, traits, and prices.

Corn Hybrids	Insect Traits	Herbicide Traits	Price Per Bag
Hybrid 1	Cry1Ab – *Cry34Ab1*	Glyphosate, Glufosinate, 2,4-D	$320
Hybrid 2	Cry1Ab	Glyphosate	$280

As Table 1 outlines, hybrid 1 offers multiple modes-of-action on insects and is tolerant to multiple herbicides. The hybrid is listed at a price per bag of $320. Hybrid 2 offers only one insect trait and is only tolerant to glyphosate herbicides. The hybrid is listed at a price per bag of $280. At a difference of $40 per bag, hybrid 1 may appear to offer more value. However, if you have low insect pressure and plan to apply glyphosate in the field this is going to be planted, hybrid 2 may be of better value.

Desired planting population can be equally impactful as the price per bag. Therefore, planting rates should be your next comparison point between hybrids. Continuing with the same two hybrid examples, let's consider differences in planting rates.

Table 2. Example comparison of planting rates on corn hybrid costs.

Corn Hybrids	Price Per Bag	Recommended Planting Rates	Kernels Per Bag	Acres Per Bag	Cost Per Acre
Hybrid 1	$320	28,000 kernels /acre	80,000	(80,000 ÷ 28,000) = 2.86 acres /bag	$320 ÷ 2.86 = $111.89 /acre
Hybrid 2	$280	32,000 kernels /acre	80,000	(80,000 ÷ 32,000) = 2.50 acres /bag	$280 ÷ 2.50 = $112.00 /acre

As Table 2 outlines, hybrid 1 is recommended at a planting rate of 28,000 kernels (plants) per acre. Divided by 80,000 kernels per bag, one bag of hybrid 1 will plant 2.86 acres. At a cost per bag of $320, the cost of planting hybrid 1 would be $111.89 per acre. In comparison, hybrid 2 is recommended at a planting rate of 32,000 kernels (plants) per acre. The same calculation reveals one bag of hybrid 2 will plant 2.50 acres. At a cost of $280 per bag, the cost of planting hybrid 2 would be $112.00 per acre.

With the addition of planting rates, only a marginal difference of $0.11 per acre exists between the two hybrids. Which hybrid should you choose?

The answer lies in reviewing your farm's criteria for what it needs out of a corn hybrid. Growth factors become an important part of the decision once you begin to look at the final cost per acre between hybrids. In the above example, it can be assumed that growth factors are similar between the two hybrids. If that were not the case, the choice could easily rest on which hybrid's attributes best meet your intended use or needs on the farm.

Alternatively, you may have multiple needs on the farm that could be served by both hybrids. Perhaps hybrid 1 is best suited to particular fields where specific weed or insect pressure has been more notable. Whereas hybrid 2 is better suited to a different set of fields that meet separate criteria. For example, hybrid 2 could have a better emergence and seedling vigor rating, making it ideal for earlier planting dates. In many cases, farms will also hedge their investment and look at purchasing multiple options to maximize their potential corn crop.

Harvest Cost Considerations

Harvest time costs can also be helpful when comparing corn hybrids. Commercial grain buyers will grade corn bushels based on a number of factors. Factors can include test weight, moisture content, kernel damage, heat damage from drying, and even non-grain or foreign material. Grain that is sold without meeting these standards is discounted by fee or reduced bushels. The most common and impactful with regard to seed selection are standard test weight and ideal storage moisture.

When considering test weight and moisture content, be sure to review corn variety trial information. Trial results will list the test weight and moisture content of each hybrid. Comparing test weight and moisture levels with potential discounts can give you an indication of harvest time costs. By combining costs with potential revenues, you can then identify hybrids that will perform and be profitable for your farm.

For more information on test weight discount, review Grain Test Weight Considerations for Corn from Purdue University (https://www.agry.purdue.edu/ext/corn/news/timeless/testweight.html).

For more information on calculating moisture discount costs for your farm, visit Corn Drying and Shrink Comparison, a document from Iowa State University (https://www.extension.iastate.edu/agdm/crops/html/a2-32.html).

Seed Selection Cost Comparison Decision Tool

The *Seed Selection Cost Comparison Decision Tool* considers all costs to seed selection and helps to identify which options maximize production and profitability. Tool comparisons provide a ranking for each seed variety based on yield and economic returns. These rankings illustrate top production and profitability options to consider in making seed purchases.

Another resource to pair with the decision tool is the MSU Variety Trials (www.canr.msu.edu/varietytrials/). Trial data includes information on test weights, moisture and yields. To download the Seed Selection Cost Comparison Decision Tool, visit: https://www.canr.msu.edu/resources/seed-selection-cost-comparison-decision-tool

Closing Thoughts

Selecting the right seed for your farm starts and stops with profitability. You want to select hybrids that are adaptable and will maximize yields across all acres. Selection starts with identifying local conditions and what you need from a corn hybrid. Understand the difference in weather patterns, field conditions, intended uses and potential pest or environmental concerns for your farm. Knowing your needs helps you to select potential options.

Often all the information needed to select corn hybrids is in the seed guide if you take time to read it. MSU Extension recommends that if you have questions as you review a seed guide, reach out to the company or your local agronomist. These individuals can best answer questions about a product they sell or work with.

The final key to profitability is to consider more than just yields. The economic returns related to seed and harvest costs are equally important, which include seed purchases, test weight, moisture shrink loss and drying charges.

Resources

MSU Extension Corn Website

https://www.canr.msu.edu/corn/

As one of the top produced agricultural commodities in Michigan, corn is integral to the state's economy. MSU Extension provides educational opportunities and resources for farmers searching for answers to improve yields, manage pests and increase profits.

Trends In Corn Plant Populations

https://ag.purdue.edu/commercialag/home/resource/2021/05/trends-in-corn-plant-populations/

Trends in seed costs are driven by both changes in seed prices and changes in corn plant populations. This article examines trends in corn plant populations in Iowa, Illinois, and Indiana.

Front page photo by Jenna Falor, MSU Extension

MICHIGAN STATE UNIVERSITY | Extension