



Tool Name

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Description:

This report provides independent and unbiased information for the evaluation of commercial corn grain and silage hybrids available in Pennsylvania. The corn hybrid evaluation program provides farmers, seed corn companies and university personnel with information on the relative performance of corn hybrids grown under Pennsylvania conditions. It should be used to supplement other sources of information, such as seed industry performance tests, other independent testing data, and on-farm performance records, when making hybrid selection decisions.

User Instructions:

The "Background" tab provides information specific to each trial location. This information is useful to evaluate selected hybrids on your farm under your growing conditions and practices. The "Table" tab contains all the data needed to make a final determination of the proper hybrids for your operation. The first factor to consider when using this report is hybrid maturity. Moisture or dry matter is a good indicator of hybrid maturity. Hybrids with lower moisture or high dry matter are generally adapted to shorter season environments. Identify hybrids in the list that you know are adapted to your area. Then, select hybrids based on the qualities you are looking for on your operation. For grain, high yielding hybrids should be selected based on moisture and maturity. Silage has many quality factors that will vary from farm to farm. Dry matter is a good place to start when selecting a silage hybrid, but working with a nutritionist will help determine what forage qualities will be best for your operation. We do not recommend using data from a single site, even if it is close to your farm, to make hybrid selection choices. It is best to use data averaged over multiple locations. The last tab "Trait Key" contains all the commercial designation of individual traits. The "Table" tab will provide the company specific nomenclature, but the "Trait Key" will give a more in depth explanation of these traits.

References:

This report is prepared by: Alex Hristov (PSU Animal Sciences), Chris Canale (Cargill), Dayton Spackman (PSU Plant Science), and James Breining (PSU Plant Science).

Acknowledgement of Risk:

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2022

Penn State/PDMP Corn Silage Hybrid Performance Trial Results

Prepared by Alex Hristov (PSU Animal Sciences), Chris Canale (Cargill), Hanna Wells (PSU Plant Science), Dayton Spackman (PSU Plant Science), and James Breining (PSU Plant Science).

Produced in cooperation with the Professional Dairy Managers of Pennsylvania (PDMP).

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Production Details: Penn State/PDMP Corn Silage Hybrid Evaluation Trials

Site:	Juniata		
Cooperator	Reinford Farms		
Planting Date	May 26, 2022		
Soil Type	Monongahela silt loam		
Herbicides	pre-	None	
	post-	Halex GT, Prowl, Sotrion, Ag Saver glyphosate, Wetsit, Envita	
Previous Crop	corn silage/rye cover		
Tillage	no-till		
Starter Fertilizer	15 gal UAN		
Insecticide	Defcon 4.67G		
Manure	None		
Fertilizer	60# N + 12# S		
Harvest Date	9/15/2022		
Field Summary:			
This site experienced drought and heat stress from early July through the first half of August. Conditions within the field were uniformly stressed.			
Weather Summary:			
Month	Precip. In.	GDD	
May 21st-June 1st	1.5	151	
June 1st-July 1st	3.3	624	
July 1st- August 1st	5.2	721	
August 1st -Sept 14th	8.2	966	
Seasonal Total	18.2"	2462	
Precip. Data:	https://climate.com		
GDD data:	http://climatesmartfarming.org/tools/csf-growing-degree-day-calculator/		

Penn State/PDMP Corn Silage Hybrid Testing Program 2022
Medium maturity (100-110) day RM silage hybrids in Port Royal, PA



Notes: SEE BACKGROUND TAB
 Cooperator: Reinford Farms

Brand	Hybrid	Traits ¹	Relative Maturity	Pop. Plants/ac	Dry Matter % ²	NIRS ³					FDMS ⁴			WC ⁵	Fresh Yield tons/ac ⁷	OM Yield tons/ac ⁸	DOM Yield tons/ac ⁹	OMD % ¹⁰
						Crude Protein %DM	Lignin %DM	Ash %DM	Starch %DM	TFA %DM	uNDF 240 hr %DM	NDFD 30 %NDF	IVSD %Starch ⁶					
Pioneer	P0487Q	39	104	34,000	43.5	8.1	2.3	2.5	46.6	3.0	28.1	8.7	55.1	55.9	17.3	5.9	3.5	59.2
Nutrien/Dyna-Gro	Dyna-Gro D48VC84	32	108	34,000	41.2	7.5	2.3	2.3	47.7	2.9	29.6	9.1	54.0	52.4	15.6	5.3	3.0	56.6
Kings Agriseeds	RT 57T85	5	107	34,000	40.3	7.3	2.3	2.4	45.4	2.9	30.0	8.4	56.9	53.5	15.9	5.4	3.1	58.2
Chemgro	6929RSX	35	109	34,000	40.2	7.4	2.4	2.4	46.5	3.1	31.3	9.1	55.1	53.9	15.5	5.3	3.1	57.8
Brevant	B10H24AM	22	110	34,000	39.7	8.2	2.2	2.6	46.7	3.0	29.8	8.1	57.3	51.3	17.0	5.8	3.4	57.4
Channel	206-16SSPRIB	36	106	34,000	39.7	8.3	2.6	2.7	42.4	2.8	28.7	8.6	55.0	48.8	14.6	5.0	2.8	55.5
Channel	206-99STXRIB	35	106	34,000	39.6	8.1	2.2	2.5	45.9	3.2	24.9	6.8	58.2	53.1	15.6	5.3	3.1	58.7
Pioneer	P0924Q	39	109	34,000	39.4	7.1	2.3	2.3	43.6	2.6	30.4	8.1	58.0	48.4	15.6	5.3	3.0	55.8
Chemgro	6835D4Z	11	108	34,000	37.9	7.4	2.3	2.3	45.9	2.9	27.7	7.9	56.7	53.3	16.3	5.6	3.2	58.1
Seed Consultants	SC1071AM	22	107	34,000	37.8	8.2	1.9	2.6	48.3	3.1	28.1	7.8	57.4	51.8	15.4	5.2	3.0	57.5
Brevant	B09F18Q	39	109	34,000	37.3	8.1	2.4	2.6	41.1	2.6	28.5	8.8	53.8	45.9	16.2	5.5	2.9	53.6
Overall Mean					39.7	7.8	2.3	2.5	45.5	2.9	28.8	8.3	56.1	51.7	15.9	5.4	3.1	57.1
LSD (0.1)					2.5	0.5	0.3	0.2	3.8	0.3	NS	NS	NS	3.3	NS	NS	NS	2.6
CV					4.5	5.0	9.1	5.7	5.9	6.6	10.4	13.2	4.4	4.5	10.3	10.3	9.7	3.2

¹ Traits: See tab "Trait Key" for individual trait designation.
² Dry Matter: Tables are sorted by dry matter. *Avoid making comparisons with hybrids that differ significantly in dry matter.*
³ NIRS: Near Infrared Spectroscopy
⁴ FDMS: In 2022 Cumberland Valley Analytical Services introduced a new in vitro fiber digestibility system, called Feed Degradation Modeling System (FDMS), to predict NDFD for all major forage classes, including fresh corn silage. We determined the relationship between FDMS NDFD30 and wet chemistry NDFD30 was strong enough to use FDMS NDFD30, and avoid the extra charge for wet chemistry NDFD30. Hence, FDMS NDFD30 will be used to calculate OMD
⁵ WC: Wet Chemistry
⁶ IVSD: Starch digestibility (% of starch) is analyzed by an in vitro wet chemistry method on samples ground through a 1-mm screen and incubated for 4 hours (IVSD).
⁷ Fresh Yield: Silage yields are expressed on a 35 percent DM basis; all other parameters are expressed on a dry matter basis.
⁸ OM Yield: silage yield (tons/ac) expressed on an organic matter (OM) basis.
⁹ DOM Yield: Yield of digestible organic matter.
¹⁰ OMD: Organic Matter Digestibility - Please see "OMD Story" tab for information on how to use this column
 NS = Not Significant

Prepared by: Alex Hristov (PSU Animal Sciences), Sergio Francisco (PSU Animal Sciences), Chris Canale (Cargill), Hanna Wells(PDMP), Dayton Spackman (PSU Plant Science), and James Breining (PSU Plant Science).

Table Key #	Trait Family Product	Bt protein(s)	Marketed for control of:	Resistance to a Bt protein in the trait package has developed in :	Herbicide tolerant?	
Conv.	Conventional	None	None	---	No	
RR2	Roundup Ready 2	None	None	---	GT	
1	Agrisure GT	None	None	---	GT	
2	Agrisure 3010 & 3010A	Cry1Ab	ECB SWCB	---	GT LL	
3	Agrisure 3000 GT, 3011A	Cry1Ab, mCry3A	ECB SWCB RW	RW	GT LL	
4	Agrisure Viptera 3110	Cry1Ab, Vip3A	BCW CEW ECB FAW SB SWCB TAW WBC	---	GT LL	
5	Agrisure Viptera 3111	Cry1Ab, mCry3A, Vip3A	BCW CEW ECB FAW SB SWCB TAW WBC RW	RW	GT LL	
6	Agrisure 3120 E-Z Refuge	Cry1Ab, Cry1F	BCW ECB FAW SB SWCB	FAW WBC	REFER TO BAG FOR SPECIFIC LETTER CODE	
7	Agrisure 3122 E-Z Refuge	Cry1Ab, Cry1F, mCry3A, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW WBC RW		
8	Agrisure Viptera 3220 E-Z Refuge	Cry1Ab, Cry1F, Vip3A	BCW CEW ECB FAW SB SWCB TAW WBC	---		
9	Agrisure Viptera 3330 E-Z Refuge	CryAb, Vip3A, Cry1A.105+CryAb2	BCW CEW ECB FAW SB SWCB TAW WBC	---		
10	Agrisure Duracade 5122 E-Z Refuge	Cry1Ab, Cry1F, mCry3A, eCry3.1Ab	BCW ECB FAW SB SWCB RW	FAW WBC RW		
11	Agrisure Duracade 5222 E-Z Refuge	Cry1Ab, Cry1F, Vip3A, mCry3A, eCry3.1Ab	BCW CEW ECB FAW SB SWCB TAW WBC RW	RW		
12	Agrisure Duracade 5332 E-Z Refuge	Cry1A.105/Cry2Ab2, Cry1Ab, Vip3A, mCry3A, eCry3.1Ab	BCW CEW ECB FAW SB SWCB TAW WBC RW	WCR		
13	Herculex 1 (HX1)	Cry1F	BCW ECB FAW SB SWCB	ECB FAW SWCB WBC		LL RR2 (most)
14	Herculex RW (HXRW)	Cry34/35Ab1	RW	RW		
15	Herculex XTRA (HXX)	Cry1F, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW SWCB WBC RW		
16	TRIssect (CHR)	Cry1F, mCry3A	BCW ECB FAW SB SWCB RW	ECB FAW SWCB WBC RW	LL RR2	
17	Intrasect (YHR)	Cry1F, Cry1Ab	BCW ECB FAW SB SWCB	FAW WBC	LL RR2	
18	Intrasect TRIssect (CYHR)	Cry1Ab, Cry1F, mCry3A	BCW ECB FAW SB SWCB RW	FAW WBC RW	LL RR2	
19	Intrasect Xtra (YXR)	Cry1F, Cry1Ab, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW WBC RW	LL RR2	
20	Intrasect Xtreme (CYXR)	Cry1F, Cry1Ab, mCry3A, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW WBC RW	LL RR2	
21	Leptra (VYHR)	Cry1F, Cry1Ab, Vip3A	BCW CEW ECB FAW SB SWCB TAW WBC	---	LL RR2	
22	AcreMax (AM)	Cry1F, Cry1Ab	BCW ECB FAW SB SWCB	FAW WBC	LL RR2	
23	AcreMax CRW (AMRW)	Cry34/35Ab1	RW	RW	LL RR2	
24	AcreMax1 (AM1)	Cry1F, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW SWCB WBC RW	LL RR2	
25	AcreMax Leptra (AML)	Cry1Ab, Cry1F, Vip3A	BCW ECB FAW SB SWCB TAW WBC CEW	---	LL RR2	
26	AcreMax TRIssect (AMT)	Cry1F, Cry1Ab, mCry3A	BCW ECB FAW SB SWCB RW	FAW WBC RW	LL RR2	
27	AcreMax Xtra (AMX)	Cry1F, Cry1Ab, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW WBC RW	LL RR2	
28	AcreMax Xtreme (AMXT)	Cry1F, Cry1Ab, mCry3A, Cry34/35Ab1	BCW ECB FAW SB SWCB RW	FAW WBC RW	LL RR2	
29	YieldGard CB (YGCB)	Cry1Ab	ECB SWCB	---	RR2	
30	YieldGard VT Rootworm (YGRW)	Cry3Bb1	RW	RW	RR2	
31	YieldGard VT Triple	Cry1Ab, Cry3Bb1	ECB SWCB RW	RW	RR2	
32	VT Double PRO VT Double PRO RIB complete	Cry1A.105, Cry2Ab2	CEW ECB FAW SB SWCB	CEW	RR2	
33	VT Triple PRO VT Triple PRO RIB complete	Cry1A.105, Cry2Ab2, Cry3Bb1	CEW ECB FAW SB SWCB RW	CEW RW	RR2	
34	Trecepta (or RIB complete)	Cry1A.105, Cry2Ab2, Vip3A	BCW CEW ECB FAW SB SWCB TAW WBC	---	RR2	
35	Smartstax Smartstax Refuge Advanced Smartstax RIB Complete	Cry1A.105, Cry2Ab2, Cry1F, Cry3Bb1, Cry34/35Ab1	BCW CEW ECB FAW SB SWCB RW	CEW WBC RW	LL RR2	
36	Smartstax Pro	Cry1A.105, Cry2Ab2, Cry1F, Cry3Bb1, Cry34/35Ab1, DvSnf7, dsRNA	BCW CEW ECB FAW SB SWCB RW	CEW WBC	LL RR2	
37	Smartstax Enlist	Cry1A.105, Cry2Ab2, Cry1F, Cry3Bb1, Cry34/35Ab1	BCW CEW ECB FAW SB SWCB RW	CEW WBC RW	LL RR2 E	
38	Powercore (or Refuge Advanced)	Cry1A.105, Cry2Ab2, Cry1F	BCW ECB FAW SB SWCB CEW	CEW WBC	LL RR2	
39	QROME (Q)	Cry1Ab, Cry1F, mCry3A, Cry34/35Ab1	BCW ECB FAW SB SWCB	FAW WBC RW	LL RR2	
	BCW = black cutworm	SB = stalk borer	GT = glyphosate tolerant			
	CEW = corn earworm	SWCB = southern corn borer	LL = Liberty Link, glufosinate tolerant			
	ECB = European corn borer	TAW = true armyworm	RR2 = Roundup Ready 2, glyphosate tolerant			
	FAW = fall armyworm	WBC = western bean cutworm				
	RW = corn rootworm					

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

The OMD Index

The digestibility of nutrients in corn silage is paramount when determining nutritional value. Starch and NDF are responsible for much of the digestible energy in corn silage. In order to give dairy producers and nutritionist a tool to evaluate corn silage hybrids, we developed a new digestibility index, called the Organic Matter Digestibility Index (OMDI or just OMD), and is based on digestibility of protein, fat, NDF, and starch. The sum of which makes up approximately 86-88% of the organic matter in corn silage.

The OMD index represents the digestible portion of silage organic matter and is based on chemical analyses only. It does not predict dry matter intake or milk production, although numerous studies clearly show that digestibility of forage organic matter is directly related to lactation performance of dairy cows. The OMD index does not represent the absolute digestibility of silage organic matter, as this can be reliably determined only in experiments with live animals. But, OMD is representative of the potentially digestible organic matter of the whole plant and can be used to compare silage hybrids. Furthermore, simulation analyses using the Cornell Net Carbohydrate and Protein System (CNCPS v. 6.55; Cornell University, Ithaca, NY) show that OMD correlates reasonably well with model-predicted milk production of dairy cows fed a standard diet containing approx. 40% corn silage (dry matter basis).

How is the OMD Index Used?

Feeding value of corn silage is mostly associated with digestibility of NDF or starch. A long-standing goal of PDMP is to create a single measure of silage nutritive value using several variables associated with digestibility. Traditional variables, crude protein (accounted for fiber-bound nitrogen), NDF, starch, lignin, and fat, are combined with digestibility determinations for NDF (FDMS NDFD30*) and starch (IVSD; 4-hour, 1-mm grind). Once combined, these digestibility coefficients sum to predict OMD.

* FDMS: In 2022 Cumberland Valley Analytical Services introduced a new in vitro fiber digestibility system, called Feed Degradation Modeling System (FDMS), to predict NDFD for all major forage classes, including fresh corn silage. We determined the relationship between FDMS NDFD30 and wet chemistry NDFD30 was strong enough to use FDMS NDFD30, and avoid the extra charge for wet chemistry NDFD30. Hence, FDMS NDFD30 will be used to calculate OMD. Hence, FDMS NDFD30 = 100

The OMD Index is calculated using the following equation: $OMDI (\%) = \frac{\{[(\text{crude protein} - \text{NDFCP}) \times 0.89] + (\text{total fatty acids} \times 0.75) + (\text{starch} \times \text{IVSD} \div 100) + [(\text{FDMS NDFom} - \text{lignin}) \times \text{FDMS NDFD30} \div 100]\}}{[(\text{crude protein} - \text{NDFCP}) + \text{total fatty acids} + \text{starch} + (\text{aNDFom} - \text{lignin})]} \times 100$.

Where: OMDI (%) is Organic Matter Digestibility Index; crude protein, total fatty acids, starch, NDFCP (NDF-bound crude protein), aNDFom (ash-free basis, amylase-treated NDF), and lignin (ash-free) are expressed as % of corn silage dry matter; 0.89 is assumed (based on literature data) coefficient of digestibility of silage crude protein; 0.75 is assumed (based on literature data) coefficient of digestibility of silage total fatty acids; IVSD is starch digestibility (by wet chemistry at 4-hour and sample ground through a 1-mm sieve) expressed as % of starch; and FDMS NDFD30.

Use of OMDI: The OMD index is intended to represent the digestible portion of silage dry matter and is based on chemical analyses. OMD does not represent the absolute digestibility of silage organic matter, but it is representative of the potentially digestible organic matter and can be used when comparing silage hybrids.

Simply put, the higher the OMD value, the higher the overall expected digestibility of the silage. OMD reflects the digestibility of key nutrients within the entire plant. Producers without carryover of silage should consider the interaction of OMD and DOM (digestible organic matter yield per acre) as yield of digestible organic matter will be equally as relevant as OMD.

Conclusion

Organic matter digestibility is not a new measure. For years, researchers and nutritionists have used digestibility estimates to formulate rations for dairy cattle. Today, integrating these data is a useful practice to gauge silage value and match hybrid to farm needs. Put simply, OMD measures whole plant digestibility. Emphasis is on digestibility of all main nutrients. In the end, we hope OMD serves to facilitate discussion among producer, seed consultant, and dairy nutritionist as to which hybrids offer the best nutrient value for dairy cows.