Tool Name

Extension Team:	Plant Science	Tool Version:	
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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 gorwn 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).

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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Penn State/PDMP Corn Silage Hybrid Testing Program 2022

Combined Mid Season Hybrids in Late Season Location Report from Juniata and Lancaster Counties

Notes: SEE INDIVIDUAL LOCATION REPORT

Cooperators: Reinford Farms and Meadow Vista Dairy

						NIRS[3]					FDMS[4]			WC[5]				
Brand	**Hybrid**	**Traits[1]**	**Relative Maturity**	**Pop. Plants/ac**	**Dry Matter %[2]**	**Crude Protein %DM**	**Lignin %DM**	**Ash %DM**	**Starch %DM**	**TFA %DM**	**NDFom %DM**	**uNDF 240 hr %DM**	**NDFD 30 %NDF**	**IVSD %Starch[6]**	**Fresh Yield tons/ac[7]**	**OM Yield tons/ac[8]**	**DOM Yield tons/ac[9]**	**OMD %[10]**
Pioneer	P0487Q	39	104	34,000	41.8	8.3	2.4	2.8	43.1	2.8	30.3	9.1	56.2	54.9	18.6	6.3	3.7	59.2
Kings Agriseeds	RT 57T85	5	107	34,000	40.1	7.5	2.4	2.6	43.3	2.6	31.4	9.1	56.4	53.8	18.2	6.2	3.6	58.3
Channel	206-16SSPRIB	36	106	34,000	40.1	8.3	2.7	3.0	41.3	2.6	31.0	9.4	54.6	51.9	17.3	5.9	3.4	56.9
Chemgro	6929RSX	35	109	34,000	39.6	7.8	2.7	2.8	40.7	2.6	33.8	10.3	54.5	55.4	17.0	5.8	3.4	58.5
Nutrien/Dyna-Gro	Dyna-Gro D48VC84	32	108	34,000	38.7	7.8	2.8	2.7	40.1	2.5	33.9	10.7	53.7	54.1	17.4	5.9	3.4	57.5
Pioneer	P0924Q	39	109	34,000	37.9	7.9	2.6	3.0	36.9	2.3	35.1	9.5	59.0	52.2	16.9	5.7	3.4	58.7
Seed Consultants	SC1071AM	22	107	34,000	37.7	8.2	2.3	2.9	44.1	2.7	30.2	8.8	56.2	53.9	17.8	6.0	3.5	58.5
Brevant	B10H24AM	22	110	34,000	37.5	8.4	2.5	3.2	40.6	2.7	32.9	9.4	57.4	55.5	17.8	6.0	3.6	59.8
Channel	206-99STXRIB	35	106	34,000	37.4	8.2	2.5	2.7	40.6	2.7	30.3	8.8	56.7	55.6	17.0	5.8	3.4	59.4
Brevant	B09F18Q	39	109	34,000	36.6	8.4	2.6	3.0	37.6	2.4	32.2	9.6	55.6	52.1	17.6	6.0	3.4	57.5
Chemgro	6835D4Z	11	108	34,000	34.7	7.7	2.7	3.0	37.5	2.3	34.0	10.4	55.3	55.2	17.8	6.0	3.5	58.5
				Overall Mean	**38.4**	**8.0**	**2.6**	**2.9**	**40.5**	**2.6**	**32.3**	**9.6**	**56.0**	**54.1**	**17.6**	**6.0**	**3.5**	**58.4**
				LSD (0.1)	**4.8**	**0.8**	**0.6**	**0.7**	**NS**	**0.6**	**NS**	**NS**	**4.7**	**NS**	**NS**	**NS**	**NS**	**NS**
				CV	**5.7**	**4.7**	**10.5**	**10.5**	**10.4**	**10.5**	**10.8**	**13.6**	**3.8**	**6.7**	**9.1**	**9.3**	**9.5**	**3.8**

[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 digestibiliy (% 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

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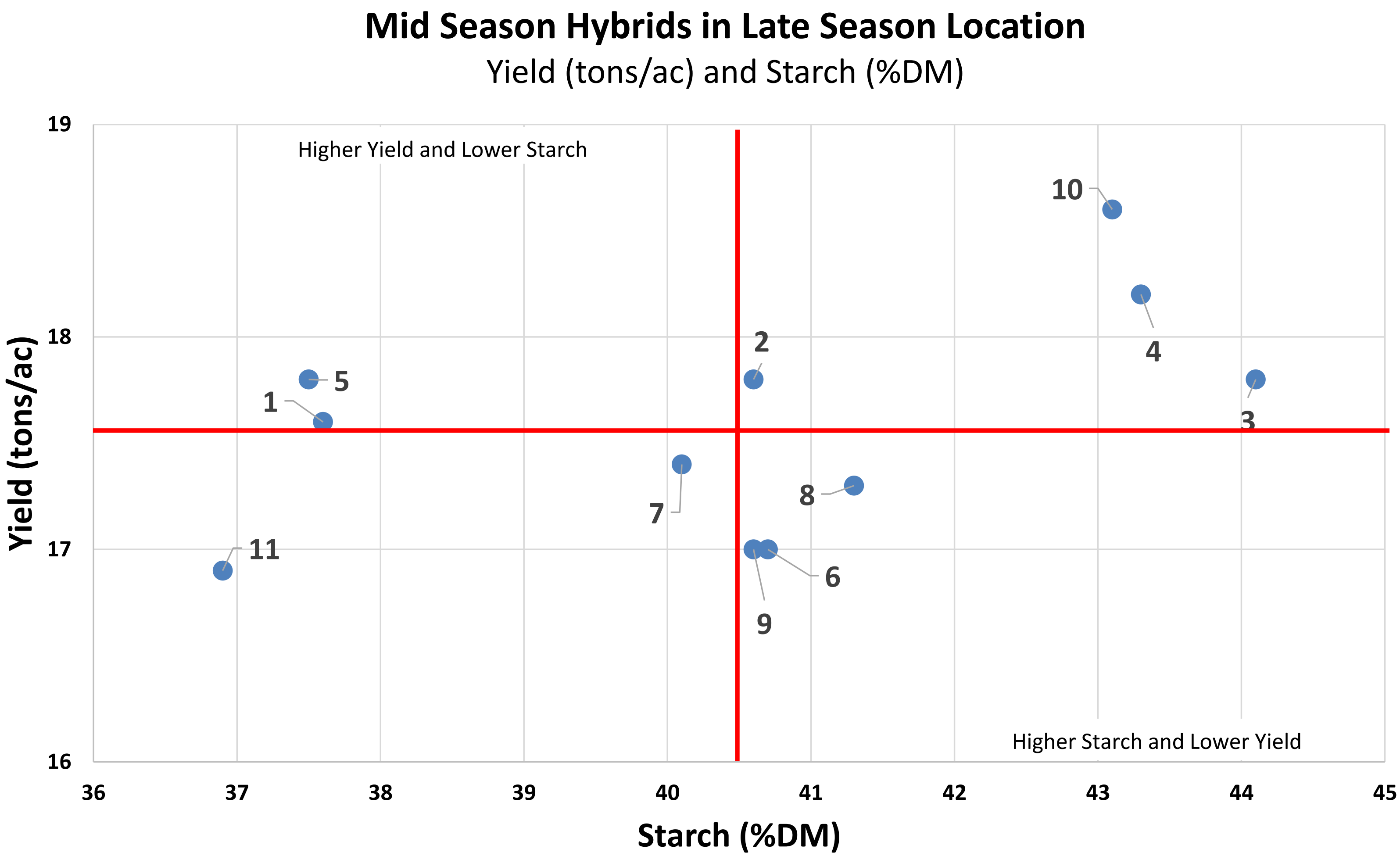
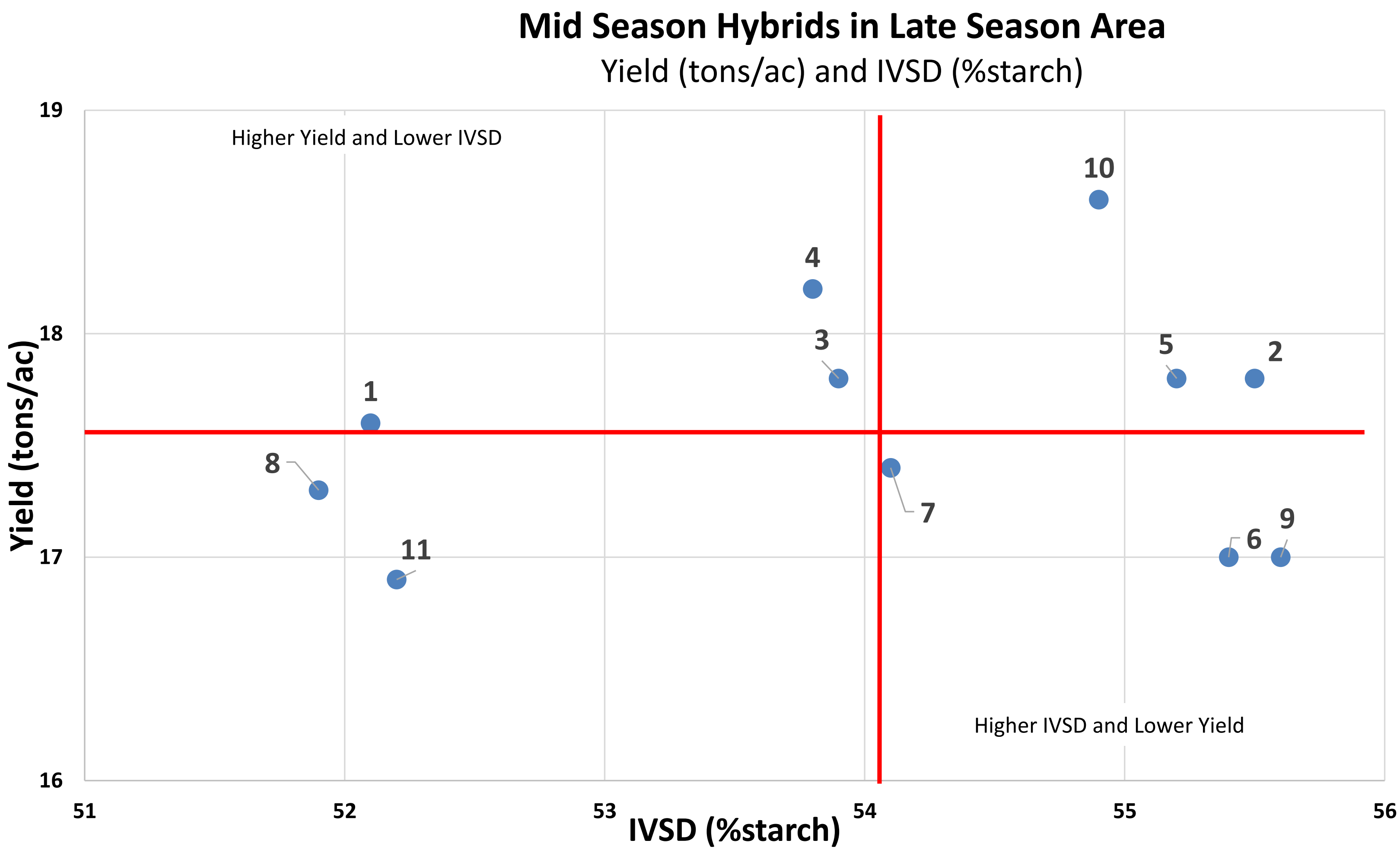


Legend
1.) Brevant B09F18Q
2.) Brevant B10H24AM
3.) Seed Cons. SC1071AM
4.) Kings RT 57T85
5.) Chemgro 6835D4Z
6.) Chemgro 6929RSX
7.) Nutrien D48VC84
8.) Channel 206-16SSPRIB
9.) Channel 206-99STXRIB
10.) Pioneer P0487Q
11.) Pioneer P0924Q

*How to use this chart: This chart can be used to determine yield (tons/ac) and starch(%DM) of corn silage hybrids. The horizontal line represents the starch mean in this group of data. The vertical line represents the fresh yield mean in this group of data. Each point represents a data point that reflects fresh yield to starch. The number beside the data point can be referenced to the hybrid name located within the legend. The LSD lines represent differences between hybrids that are significantly different at the 0.1 level. These lines can be moved around within the plot of data.



Legend
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2.) Brevant B10H24AM
3.) Seed Cons. SC1071AM
4.) Kings RT 57T85
5.) Chemgro 6835D4Z
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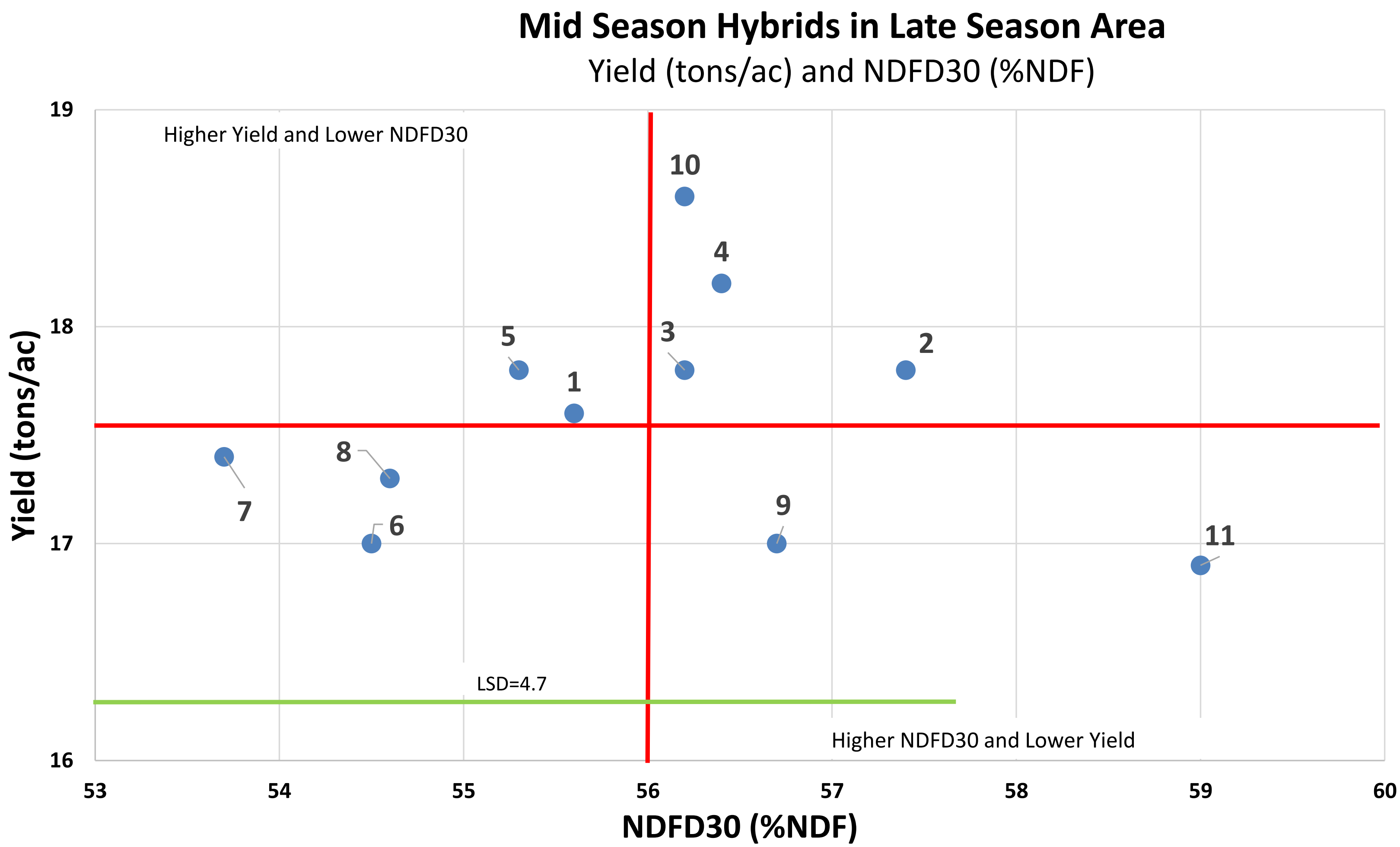
7.) Nutrien D48VC84
8.) Channel 206-16SSPRIB
9.) Channel 206-99STXRIB
10.) Pioneer P0487Q
11.) Pioneer P0924Q

*How to use this chart: This chart can be used to determine yield (tons/ac) and IVSD(%starch) of corn silage hybrids. The horizontal line represents the IVSD mean in this group of data. The vertical line represents the fresh yield mean in this group of data. Each point represents a data point that reflects fresh yield to IVSD. The number beside the data point can be referenced to the hybrid name located within the legend. The LSD lines represent differences between hybrids that are significantly different at the 0.1 level. These lines can be moved around within the plot of data.



Legend
1.) Brevant B09F18Q
2.) Brevant B10H24AM
3.) Seed Cons. SC1071AM
4.) Kings RT 57T85
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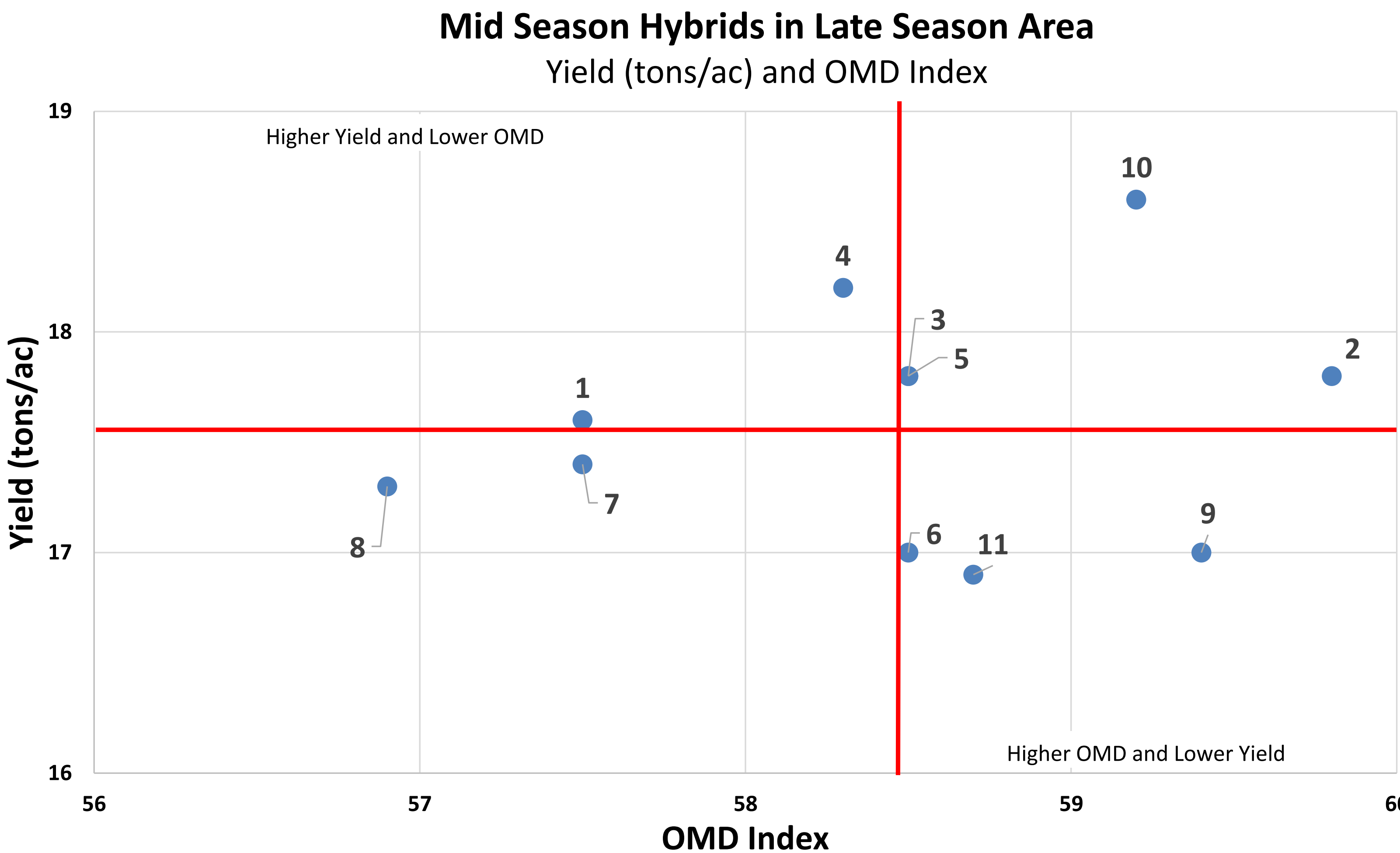
6.) Chemgro 6929RSX
7.) Nutrien D48VC84
8.) Channel 206-16SSPRIB
9.) Channel 206-99STXRIB
10.) Pioneer P0487Q
11.) Pioneer P0924Q

*How to use this chart: This chart can be used to determine yield (tons/ac) and FDMS NDFD30 (%NDF) of corn silage hybrids. The horizontal line represents the NDFD30 mean in this group of data. The vertical line represents the fresh yield mean in this group of data. Each point represents a data point that reflects fresh yield to NDFD30. The number beside the data point can be referenced to the hybrid name located within the legend. The LSD lines represent differences between hybrids that are significantly different at the 0.1 level. These lines can be moved around within the plot of data.



Legend

1.) Brevant B09F18Q
2.) Brevant B10H24AM
3.) Seed Cons. SC1071AM
4.) Kings RT 57T85
5.) Chemgro 6835D4Z
6.) Chemgro 6929RSX
7.) Nutrien D48VC84
8.) Channel 206-16SSPRIB
9.) Channel 206-99STXRIB
10.) Pioneer P0487Q
11.) Pioneer P0924Q

*How to use this chart: This chart can be used to determine yield (tons/ac) and the OMD Index of corn silage hybrids. The horizontal line represents the OMD Index mean in this group of data. The vertical line represents the fresh yield mean in this group of data. Each point represents a data point that reflects fresh yield to the OMD Index. The number beside the data point can be referenced to the hybrid name located within the legend. The LSD lines represent differences between hybrids that are significantly different at the 0.1 level. These lines can be moved around within the plot of data.

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	TRIsect (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 TRIsect (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 TRIsect (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 (%) = {[(crude protein – NDFCP) × 0.89] + (total fatty acids × 0.75) + (starch × IVSD ÷ 100) + [(FDMS NDFom - lignin) × FDMS NDFD30 ÷ 100)]} ÷ [(crude protein – NDFCP) + total fatty acids + starch + (aNDFom – lignin)] × 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.