2013 MILNOR YIELD TRIAL

The NDSU corn breeding program planted 52 breeding experiments across >50 state and regional locations in 2013.
Our program managed, in 2013 (as in previous years), the largest testing network of commercial hybrids for North Dakota.
Nine locations were grown with the objective to find strengths and weaknesses of hybrids available in the market.
A hybrid with top yields at only one testing site could be hiding weaknesses not easily seen in just one location.
Growing the same hybrids across several testing sites within regions increases chances to expose weaknesses.
There is a need to grow as many locations as possible within North Dakota regions in order to select top hybrids
Select genetically diverse hybrids showing unbiased and stable performance across locations and regions

Company	Hybrid	RM	Grain Moisture (%)	Grain Yield (bu/A)	Test Weight (lb/bu)	Stalk Lodging (%)	Root Lodging (%)	Ear Drop (%)
Nutech	3F-198™	98	21.1	136.9	51.0	0.0	78.6	0.0
Monsanto	DKC38-03	88	22.0	130.2	53.7	0.1	89.9	0.0
Nutech	5B-290™	90	22.4	139.5	50.0	0.1	88.2	0.0
Nutech	5Z-9605™	96	23.3	118.4	52.3	0.0	31.7	0.0
Proseed	1292 VT2 P	92	23.5	145.6	52.4	0.0	47.3	0.0
Wensman	W 90935VT3PRO	93	24.0	126.4	54.8	0.0	85.8	0.0
Stine	9422 VT3Pro1B	94	24.8	124.4	50.5	0.0	75.1	0.0
Hyland	8315	92	25.1	141.5	49.2	0.0	52.2	0.0
Peterson	PFS 73D91	91	25.2	143.0	51.4	0.1	76.1	0.0
Nutech	5X-698™	98	25.4	112.0	49.4	1.4	58.0	0.0
MID RM	NDSU CHECK	92	25.8	144.5	54.9	0.0	12.6	0.0
Dahlman	R48-32VT3PRIB	96	26.4	108.7	49.1	0.0	71.3	0.0
Monsanto	DKC46.20	96	26.4	133.9	51.2	0.1	42.9	0.0
Stine	9313 VT3Pro	94	26.4	114.7	51.6	0.0	74.0	0.0
NorthStar	VS 94-594	94	26.7	128.7	49.5	0.0	90.9	0.0
Nutech	5X-795™	95	26.8	115.2	49.2	0.1	60.8	0.0
Nutech	5X-894™	94	26.9	129.8	49.3	1.3	58.0	0.0
Hyland	4398	96	27.1	127.5	50.0	0.0	95.1	0.0
Nutech	5N-9404™	94	27.5	135.8	51.8	1.3	44.3	0.0
Wensman	W 90967STX	96	27.7	110.8	50.4	0.0	91.7	0.0
Integra	9455VT2Pro	94	27.8	148.8	50.9	0.0	48.3	0.0

Nutech	5N-9802™	98	27.9	121.7	51.5	0.1	28.9	0.0
Peterson	PFS 55S96	96	28.0	136.3	49.5	0.0	67.7	0.0
Proseed	PX92R VT3P	92	28.3	138.3	55.6	0.0	56.4	0.0
Proseed	1191 SS	91	28.6	123.8	50.7	0.0	47.4	0.0
NorthStar	VS 96-596	96	28.9	116.4	51.6	0.1	31.0	0.0
Proseed	1295 SS	95	29.1	124.2	50.1	0.0	78.1	0.0
Dahlman	R47-35VT3PRIB	94	29.8	116.8	51.6	0.0	28.2	0.0
Peterson	PFS 76S92	92	31.2	132.6	50.3	0.0	64.4	0.0
Monsanto	DKC43-10	93	32.8	120.5	49.7	0.0	84.1	0.0
Mean			26.6	128.2	51.1	0.2	62.0	0.0
Efficiency compared to a RCBD			**134.0**	114.8	106.3	95.6	132.2	0.0
CV%			3.9	9.6	2.9	371.9	41.4	0.0
LSD (5%)			2.9	12.5	2.9	1.2	54.8	0.0

Experiments conducted by the NDSU Corn Breeding Program in dryland condition in Milnor 2013.

RM = Relative maturity given by Industry. Be cautious. As shown in results they may not correspond to moisture at harvest

The Lattice design was up to 134% (MOISTURE) more efficient than a Randomized Complete Block Design (RCBD)

Most fields in North Dakota have undesirable field variation. Therefore, field trial managers should avoid RCBDs.

LATTICES are grown by the NDSU corn breeding program, they are planted and harvested the same way a (RCBD) would be.

The statistical analyses, however, eliminates bias due to the environment even in uniform fields. They are very simple to manage.

The larger the number of hybrids in one experiment the larger the variation that cannot be explained by hybrid differences.

Therefore, the NDSU corn breeding program grows experiments arranged in lattice experimental designs.

These can fix undesirable experimental variation seen in randomized complete block designs (RCBD) for each trait evaluated.

Harvested Stand = 33,600 plants/A

Severe Root Lodging

No significant differences across hybrids for stand

The information generated by the ND corn breeding program in multi-location high and low yielding environmental trials
of the same industry hybrids across ND regions was worth $ Millions for hybrid selection by farmers,
based on the genetic differences found among hybrids in lattice designs.

It is very tempting to discard test trials due to high *Coefficients of Variation (CVs)* or large *Least Significant Differences (LSDs)*.

In many cases, data is proposed to be discarded when it could be the most useful to easily expose hybrid deficiencies.

Be cautious, experimental errors are much more important than CVs. CVs do not tell the whole story.

CVs are dependent of experiment means as low mean experiments will make CVs to be larger in accurate experiments.

There is the need to grow hybrids in low yielding environments to expose their weaknesses.

If trials have low yields due to drought, CVs might look high but they are the best trials showing drought susceptible hybrids.

If you see hybrids with 50% and 0% lodging across locations, both CVs and LSDs could be large but useful for hybrid selection.