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**2014 Colorado Corn
Variety Performance Trials**

Table of Contents

Authors.....	3
Acknowledgments.....	3
2014 Colorado Corn Hybrid Performance Trials.....	4
2014 Irrigated Corn Hybrid Performance Trial at Burlington	5
2014 Irrigated Corn Hybrid Performance Trial at Holyoke.....	6
2014 Irrigated Corn Hybrid Performance Trial at Rocky Ford.....	7
2014 Irrigated Corn Hybrid Performance Trial at Wiggins.....	8
2014 Irrigated Corn Hybrid Performance Trial at Yuma.....	9
2014 Dryland Corn Hybrid Performance Trial at Akron.....	10
Evaluation of Drought Tolerant Corn Yield Performance at Different Plant Densities in Dryland Conditions.....	11

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2014 Colorado Corn Hybrid Performance Trials

Colorado State University conducts hybrid corn performance trials to provide unbiased and reliable information to Colorado corn producers so they can select the best hybrids for their farms. The corn hybrid performance trials are possible by funding received from company entry fees, the CSU Agricultural Experiment Station, and the Colorado Corn Growers Association.

Colorado produced approximately 147 million bushels of corn on 1 million harvested acres in 2014 according to the USDA National Ag. Statistics Service. The total value of production was over 600 million dollars in 2013 (most recent year available). Figure 1 shows the dryland and irrigated corn acres planted in Colorado from 1994 through 2013. There has been a spectacular increase in dryland acreage over the last 20 years, starting from 95,000 acres in 1994 and increasing to a high of 610,000 dryland acres in 2011. The increase in dryland acreage is due to introduction of herbicide tolerant hybrids that are grown in no-till or medium-till cropping systems. In some years, higher corn prices have also led to increased corn acreage. However, the rapid decrease in corn value (\$5.80/bushel in January 2013 to \$3.20 /bushel in December 2014) and stubbornly high prices for corn inputs will combine to make corn less desirable and might result in reduced corn acreage.

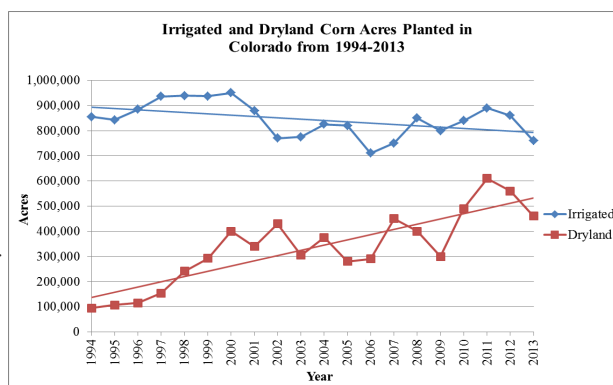


Figure 1: Irrigated and Dryland Corn Acres Planted in Colorado from 1994-2013

Figure 2 shows the yearly average yield for irrigated and dryland corn in Colorado from 1994 through 2013. There is a steady linear increase in irrigated yield from 163 bu/ac in 1994 to 183 bu/ac in 2013, however in 2006 and 2010 average yields were 200 bu/ac or better. Although improved genetics and more precise farming practices may account for the increasing general trend in average irrigated yield, the high average yields in 2006 and 2010 were most likely due to higher than average growing season heat units (longer growing season).

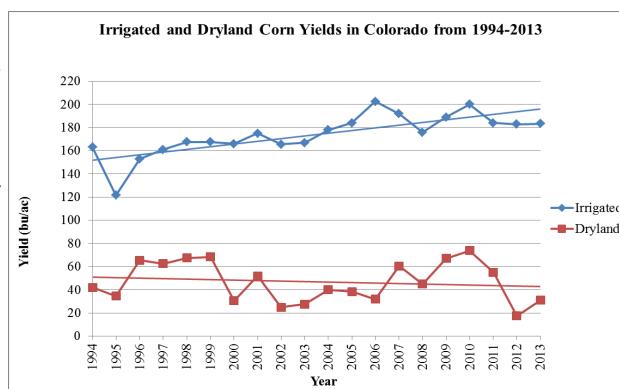


Figure 2: Irrigated and Dryland Corn Yields in Colorado from 1994-2013

The average dryland yields are highly dependent on weather conditions during the growing season. The amount and timing of rainfall received can make-or-break dryland corn yields. This was true in the drought years from 2002 through 2006, and again in 2012 and 2013 when there was not enough rainfall during the growing season and the dryland yield fell below 50 bu/ac.

Colorado State University personnel planted five irrigated and two dryland corn trials throughout eastern Colorado in 2014. Irrigated locations included Burlington, Holyoke, Rocky Ford, Wiggins, and Yuma. The two dryland trials were located at Akron and Dailey. We lost one trial this year (Dailey) due to a severe hailstorm in mid-June. Fifty-four hybrids with diverse origins, maturities, and value-added traits were tested in our different irrigated and dryland trial locations. Plot sizes were approximately 150 ft². All irrigated trials were planted at 35,000 seeds per acre and both dryland trials were planted at 15,000

2014 Irrigated Corn Hybrid Performance Trial at Burlington

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b	2-Year	Relative	Moisture	Test Weight	Plant Height	Population	Lodging
			bu/ac	Avg. Yield	Maturity ^c					
AgVenture	RL5811HBW	HXT, RR2, LL	234.0	-	100	13.5	56.6	73	28,953	1.0
Mycogen	2C799	RASS, RR2, LL	224.3	-	113	17.8	56.9	80	28,386	0.4
Mycogen	2P659	RASS, RR2, LL	221.4	-	108	16.6	57.0	87	29,785	0.0
AgVenture	RL7687YHB	INTX, RR2, LL	216.4	-	110	15.5	60.0	79	28,584	1.0
Mycogen	2V709	RASS, RR2, LL	213.0	198.6	110	18.6	56.8	82	29,050	0.0
Mycogen	X14504S2	Experimental	207.8	-	106	14.9	58.1	83	26,486	1.6
Channel	211-24STXRIB	STXRIB, RR2, LL	204.6	-	111	15.4	58.1	84	27,824	0.0
Channel	209-53STXRIB	STXRIB, RR2, LL	192.5	-	109	16.5	58.1	78	27,788	1.4
Mycogen	2D599	RASS, RR2, LL	191.0	-	106	15.8	57.9	80	26,508	1.2
AgVenture	RL7362HB	HX, RR2, LL	185.5	-	106	14.4	59.0	77	26,536	0.4
NuTech/G2 Genetics	5F-709	AM, RR2, LL	184.4	196.6	109	16.1	59.2	75	26,151	0.0
Channel	208-49STXRIB	STXRIB, RR2, LL	182.4	-	108	15.5	59.6	73	25,369	0.4
NuTech/G2 Genetics	5H-806	HX, RR2, LL	179.0	175.1	106	15.3	58.8	76	27,128	0.7
Mycogen	2G685	3000GT, GT, LL	176.1	183.8	109	15.7	56.3	76	28,841	1.7
Mycogen	2R549	RASS, RR2, LL	166.0	-	104	15.0	59.4	78	24,571	2.0
NuTech/G2 Genetics	5Z-707	INT, RR2, LL	162.4	164.3	107	14.9	59.7	74	25,318	0.4
Average			196.3	183.7	108	15.7	58.2	78	27,330	0.8

^dLSD (P<0.30)

17.0

^aTechnology trait designations: 3000GT=Agrisure 3000GT; AM=Optimum AcreMax; GT=Glyphosate tolerant; HX=Herculex 1; HXT=Herculex XTRA; INT=Optimum Intraject; INTX=Optimum Intraject Xtra; LL=LibertyLink; RASS=Refuge Advanced by SmartStax (Refuge in the Bag); RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete.

^bYields corrected to 15.5% moisture.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Plot size: 5' x 30'

Site Information

Collaborator: Tim Stahlecker
 Planting Date: 5/5/2014
 Harvest Date: 10/30/2014
 Trial Comments: The trial experienced heavy rain and moderate hail damage in mid-June, resulting in reduced stands.
 Fertilizer: Nitrogen at 210, phosphorus at 60, potassium at 20, sulfur at 15, and zinc at 1.5 lb/ac
 Herbicide: Roundup and Laudis
 Soil Type: Kuma-Keith Silt Loam
 Irrigation Type: Center-pivot

2014 Irrigated Corn Hybrid Performance Trial at Holyoke

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	2-Year		Relative Maturity ^c	Test Moisture	Test Weight	Plant Height	Plant Population	Lodging
			Yield ^b bu/ac	Avg. Yield bu/ac						
AgVenture	RL7687YHB	INTX, RR2, LL	278.8	-	110	14.0	59.3	90	32,525	0.0
AgVenture	RL8767HB	HX, RR2, LL	271.7	-	113	12.7	56.7	92	31,223	0.0
NuTech/G2 Genetics	5H-905	HX, RR2, LL	260.6	250.9	105	13.3	58.5	85	30,105	0.0
Producers Hybrids	7268STXRIB	STXRIB, RR2, LL	259.9	257.5	112	14.4	57.9	84	32,407	0.3
Channel	209-53STXRIB	STXRIB, RR2, LL	256.6	-	109	12.9	57.8	84	32,331	0.3
NuTech/G2 Genetics	5F-399	AM, RR2, LL	256.0	254.6	99	11.6	56.3	81	31,548	0.0
AgVenture	RL7362HB	HX, RR2, LL	252.8	-	106	12.7	57.3	85	30,049	0.3
Channel	208-49STXRIB	STXRIB, RR2, LL	249.0	-	108	13.5	59.3	85	30,879	0.3
Mycogen	2D599	RASS, RR2, LL	240.2	-	106	12.8	56.2	89	32,622	0.0
NuTech/G2 Genetics	5F-805	AM, RR2, LL	239.9	246.8	105	13.4	58.0	86	30,796	0.0
Mycogen	2R549	RASS, RR2, LL	239.7	232.2	104	12.4	56.5	86	31,750	0.0
NuTech/G2 Genetics	5F-198	AM, RR2, LL	239.5	238.5	98	10.5	54.7	86	32,297	0.0
LG Seeds	LG2549	VT3PRIB, RR2	239.1	217.7	109	11.6	54.7	83	30,298	0.0
Mycogen	2V709	RASS, RR2, LL	238.8	241.2	110	12.8	56.9	87	33,092	0.9
Producers Hybrids	7213VT2RIB	VT2RIB, RR2	238.2	-	112	12.2	57.5	83	32,794	0.3
AgVenture	RL5811HBW	HXT, RR2, LL	237.3	-	100	11.7	55.0	80	31,944	0.6
Mycogen	X14504S2	Experimental	235.6	-	106	12.1	57.4	89	31,997	0.6
Producers Hybrids	7198STXRIB	STXRIB, RR2, LL	234.9	-	111	11.6	57.1	80	30,817	1.3
Producers Hybrids	6968STXRIB	STXRIB, RR2, LL	230.7	-	109	12.4	58.7	81	31,127	0.0
NuTech/G2 Genetics	5H-502	HX, RR2, LL	230.0	229.1	102	12.5	58.2	84	30,524	0.0
NuTech/G2 Genetics	5Z-002	INT, RR2, LL	228.6	-	102	12.6	57.6	83	32,931	0.3
Mycogen	2T498	RASS, RR2, LL	224.6	-	100	12.0	56.3	84	32,428	0.0
LG Seeds	LG2602	VT3PRIB, RR2	222.8	215.5	112	12.1	54.3	85	31,654	0.0
LG Seeds	LG5524	VT3PRIB, RR2	218.8	209.4	105	10.8	55.6	92	29,398	0.0
Mycogen	2G685	3000GT, GT, LL	215.9	220.5	109	12.3	54.8	82	32,156	0.3
Producers Hybrids	7088STXRIB	STXRIB, RR2, LL	215.5	-	110	11.8	57.7	96	31,205	0.6
Mycogen	X14402S3	Experimental	211.7	-	99	10.9	54.5	83	32,026	0.0
LG Seeds	LG5579	VT3PRIB, RR2	211.0	213.3	109	12.6	56.1	86	31,170	0.3
Channel	202-64STXRIB	STXRIB, RR2, LL	208.6	-	102	12.4	58.3	85	31,266	0.3
Producers Hybrids	6878STXRIB	STXRIB, RR2, LL	202.5	-	108	11.7	56.7	89	31,143	0.6
Average			236.3	232.9	106	12.3	56.9	85	31,550	0.3

^dLSD (P<0.30)

12.1

^aTechnology trait designations: 3000GT=Agrisure 3000GT; AM=Optimum AcreMax; GT=Glyphosate tolerant; HX=Herculex 1; HXT=Herculex XTRA; INT=Optimum Intrasect; INTX=Optimum Intrasect Xtra; LL=LibertyLink; RASS=Refuge Advanced by SmartStax (Refuge in the Bag); RR2=Roundup Ready 2; SSX=SmartStax; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT2RIB=Genuity VecTran Double Protection Refuge in the Bag Complete; VT3PRIB=Genuity VecTran Triple Protection Refuge in the Bag Complete.

^bYields corrected to 15.5% moisture.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Plot size: 5' x 30'

Site Information

Collaborator: Brent Adler
 Planting Date: 5/3/2014
 Harvest Date: 11/4/2014
 Fertilizer: Nitrogen at 240, phosphorus at 75, potassium at 80, sulfur at 40, and zinc at 1.5 lb/ac
 Herbicide: Status, Roundup, and Dual
 Insecticide: Capture and Lorsban
 Soil Type: Valent Sand and Haxtun Loamy Sand
 Irrigation Type: Center-pivot

2014 Irrigated Corn Hybrid Performance Trial at Rocky Ford

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	2-Year		Relative	Test Weight	Plant Height	Silk Date	Population	
			Yield ^b	Avg. Yield	Maturity ^c					Moisture
			bu/ac	bu/ac		percent	lb/bu	in	days after planting	plants/ac
LG Seeds	LG5618	STXRIB, RR2, LL	251.0	237.6	112	16.5	59.8	98	70	28,478
Mycogen	2J794	HX, RR2, LL	232.0	-	115	18.9	54.8	106	72	28,103
LG Seeds	LG2642	VT3PRIB, RR2	230.2	216.2	115	17.4	56.5	99	69	28,853
Mycogen	2Y767	RASS, RR2, LL	228.1	-	114	16.5	55.8	104	71	28,759
Mycogen	2C788	RASS, RR2, LL	227.5	-	114	18.2	56.9	99	75	29,321
LG Seeds	LG2636	VT3PRIB, RR2	227.1	209.1	114	16.3	56.9	105	71	29,321
LG Seeds	LG5612	STXRIB, RR2, LL	220.3	-	112	15.1	58.6	106	70	30,070
Mycogen	2G685	3000GT, GT, LL	214.4	-	109	15.2	58.4	104	71	29,508
Mycogen	2C799	RASS, RR2, LL	213.4	-	113	15.5	57.8	104	72	30,539
Mycogen	2V709	RASS, RR2, LL	208.2	-	110	16.2	58.4	105	72	31,007
Mycogen	2P659	RASS, RR2, LL	184.3	-	108	15.3	58.2	111	73	27,916
Average			221.5	221.0	112	16.5	57.5	104	72	29,261

^dLSD (P<0.30)

12.9

^aTechnology trait designations: 3000GT=Agrisure 3000GT; GT=Glyphosate tolerant; HX=Herculex 1; LL=LibertyLink; RASS=Refuge Advanced by SmartStax (Refuge in the Bag); RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT3PRIB=Genuity VecTran Triple Protection Refuge in the Bag Complete.

^bYields corrected to 15.5% moisture.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Plot size: 5' x 31'

Site Information

Collaborators: Arkansas Valley Research Center (Mike Bartolo, Jeff Davidson, & Kevin Tanabe)

Planting Date: 5/5/2014

Harvest Date: 10/31/2014

Irrigation: Furrow

Soil Type: Rocky Ford silty clay loam

2014 Irrigated Corn Hybrid Performance Trial at Wiggins

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	2-Year		Test		Plant		Lodging percent
				Avg. Yield	Relative Maturity ^c	Moisture percent	Weight lb/bu	Height in	Population plants/ac	
AgVenture	RL7687YHB	INTX, RR2, LL	266.0	-	110	14.8	61.1	95	32,960	0.9
Mycogen	X14504S2	Experimental	236.8	-	106	13.4	58.6	94	31,023	1.6
Channel	208-49STXRIB	STXRIB, RR2, LL	230.3	-	108	14.5	60.1	85	32,331	0.3
AgVenture	RL5811HBW	HXT, RR2, LL	229.3	-	100	12.4	56.8	80	30,976	1.0
Mycogen	2D599	RASS, RR2, LL	218.5	-	106	12.4	57.6	90	32,074	0.3
NuTech/G2 Genetics	5F-805	AM, RR2, LL	215.5	213.0	105	13.4	59.9	84	29,083	0.0
NuTech/G2 Genetics	5Z-002	INT, RR2, LL	214.4	-	102	12.2	59.5	86	30,589	0.6
LG Seeds	LG5499	STXRIB, RR2, LL	211.0	202.2	100	11.8	60.2	84	32,815	0.9
NuTech/G2 Genetics	5F-399	AM, RR2, LL	209.1	190.2	99	11.3	57.3	85	31,310	0.3
NuTech/G2 Genetics	5H-905	HX, RR2, LL	208.3	207.8	105	11.9	56.2	85	31,170	0.6
NuTech/G2 Genetics	5H-502	HX, RR2, LL	204.9	200.0	102	11.7	59.8	84	30,454	2.1
Channel	202-64STXRIB	STXRIB, RR2, LL	203.9	-	102	11.5	59.5	89	32,592	1.2
Channel	197-68STXRIB	STXRIB, RR2, LL	203.3	-	97	11.0	58.9	83	30,991	0.0
LG Seeds	LG5524	VT3PRIB, RR2	202.7	193.3	105	9.9	56.4	90	32,234	0.6
Mycogen	X13534VH	Experimental	199.3	-	104	12.1	56.7	86	31,266	0.6
LG Seeds	LG5522	VT3PRIB, RR2	194.5	186.4	103	9.9	56.6	85	32,815	0.6
LG Seeds	LG5470	STXRIB, RR2, LL	193.1	182.6	98	10.9	58.6	82	32,675	2.6
Mycogen	2R549	RASS, RR2, LL	192.5	187.6	104	11.6	58.5	90	31,750	2.1
NuTech/G2 Genetics	5F-198	AM, RR2, LL	180.0	173.8	98	10.6	55.6	83	31,654	0.6
Mycogen	X14402S3	Experimental	177.7	-	99	11.0	56.3	84	31,727	0.9
Mycogen	2Y479	RASS, RR2, LL	174.7	182.0	98	11.6	57.4	84	31,036	2.2
Mycogen	2T498	RASS, RR2, LL	167.0	167.0	100	10.9	58.6	85	32,331	6.0
Average			206.0	190.5	102	11.9	58.2	86	31,630	1.2

^dLSD (P<0.30)

12.0

^aTechnology trait designations: AM=Optimum AcreMax; HX=Herculex 1; HXT=Herculex XTRA; INT=Optimum Intrasect; INTX=Optimum Intrasect Xtra; LL=LibertyLink; RASS=Refuge Advanced by SmartStax (Refuge in the Bag); RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT3PRIB=Genuity VecTran Triple Protection Refuge in the Bag Complete.

^bYields corrected to 15.5% moisture.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Plot size: 5' x 30'

Site Information

Collaborator: Cooksey Farms
 Planting Date: 5/3/2014
 Harvest Date: 11/1/2014
 Soil Type: Heldt Clay
 Irrigation Type: Center-pivot

2014 Irrigated Corn Hybrid Performance Trial at Yuma

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b		2-Year	Relative	Test		Plant	Lodging	
			bu/ac	bu/ac	Avg. Yield	Maturity ^c	Moisture	Weight	Height		Population
AgVenture	RL7687YHB	INTX, RR2, LL	279.6	-		110	16.3	59.3	100	31,847	0.0
LG Seeds	LG5618	STXRIB, RR2, LL	279.0	-		112	17.3	58.1	85	32,525	0.0
Channel	209-53STXRIB	STXRIB, RR2, LL	274.8	-		109	15.7	58.4	85	31,944	0.3
AgVenture	RL8767HB	HX, RR2, LL	271.1	-		113	16.7	56.8	87	32,041	0.0
AgVenture	RL5811HBW	HXT, RR2, LL	265.4	-		100	13.4	55.7	84	33,061	0.0
Mycogen	2V709	RASS, RR2, LL	264.6	248.0		110	16.0	57.3	88	32,421	0.0
Mycogen	2C788	RASS, RR2, LL	260.5	-		114	17.1	55.7	92	34,267	0.0
Channel	208-49STXRIB	STXRIB, RR2, LL	252.8	-		108	15.5	59.3	87	32,124	0.3
Mycogen	2C799	RASS, RR2, LL	251.1	-		113	15.8	56.7	95	32,912	0.0
Mycogen	X14504S2	Experimental	248.7	-		106	14.3	57.8	93	31,764	0.0
NuTech/G2 Genetics	5H-905	HX, RR2, LL	245.7	247.1		105	14.4	57.1	84	31,098	0.0
LG Seeds	LG2602	VT3PRIB, RR2	244.2	228.9		112	12.9	55.6	91	33,202	0.0
Mycogen	2D599	RASS, RR2, LL	242.5	-		106	13.8	57.0	96	33,949	0.0
Channel	211-24STXRIB	STXRIB, RR2, LL	236.2	-		111	13.5	57.7	89	31,909	0.3
Mycogen	2R549	RASS, RR2, LL	235.4	237.1		104	13.3	57.8	91	32,697	1.3
NuTech/G2 Genetics	5F-805	AM, RR2, LL	234.8	239.9		105	15.9	58.1	88	30,395	0.0
NuTech/G2 Genetics	5F-399	AM, RR2, LL	230.3	230.1		99	12.9	56.8	87	31,584	0.0
NuTech/G2 Genetics	5H-502	HX, RR2, LL	228.0	232.2		102	13.9	58.6	86	31,557	0.0
NuTech/G2 Genetics	5Z-002	INT, RR2, LL	227.7	-		102	13.5	58.4	86	31,944	0.3
NuTech/G2 Genetics	5F-198	AM, RR2, LL	226.1	223.9		98	12.3	56.0	87	31,266	0.0
Mycogen	2G685	3000GT, GT, LL	224.4	222.6		109	13.1	56.9	85	32,476	0.6
LG Seeds	LG5524	VT3PRIB, RR2	224.3	222.1		105	12.3	55.8	91	31,735	1.6
LG Seeds	LG5579	VT3PRIB, RR2	223.7	219.6		109	12.8	56.8	86	32,546	0.0
Average			246.6	231.9		107	14.5	57.3	89	32,229	0.2

^dLSD (P<0.30)

12.0

^aTechnology trait designations: 3000GT=Agrisure 3000GT; AM=Optimum AcreMax; GT=Glyphosate tolerant; HX=Herculex 1; HXT=Herculex XTRA; INT=Optimum Intrasect; INTX=Optimum Intrasect Xtra; LL=LibertyLink; RASS=Refuge Advanced by SmartStax (Refuge in the Bag); RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT3PRIB=Genuity VecTran Triple Protection Refuge in the Bag Complete.

^bYields corrected to 15.5% moisture.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Plot size: 5' x 30'

Site Information

Collaborator: Larry Gardner

Planting Date: 5/7/2014

Harvest Date: 11/5/2014

Fertilizer: Starter: Nitrogen at 9, phosphorus at 25, potassium at 4, sulfur at 5, and zinc at 0.25 lb/ac

After planting: Nitrogen at 250, phosphorus at 25, potassium at 4, sulfur at 5, and zinc at 0.25 lb/ac

Herbicide: Brawl, Touchdown, Lockdown, and Prowl

Insecticide/Fungicide: Hendragol, Belt, Quilt, Aurora

Soil Type: Haxtun Loamy Sand

Irrigation Type: Center-pivot

2014 Dryland Corn Hybrid Performance Trial at Akron

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	Relative Maturity ^c	Test			
					Moisture percent	Weight lb/bu	Population plants/ac	Lodging percent
NuTech/G2 Genetics	5Z-707	INT, RR2, LL	92.7	107	12.6	56.1	10,382	0.0
Channel	198-00DGVT2PRIB	DG,VT2PRIB, LL	76.9	98	12.3	56.0	10,890	2.4
Mycogen	X13534VH	Experimental	74.4	104	14.3	55.7	11,834	0.0
NuTech/G2 Genetics	5X-698	HXT, RR2, LL	65.5	98	12.8	57.5	11,616	5.0
Channel	201-00DGVT2PRIB	DG, VT2PRIB, LL	60.9	101	15.7	58.4	10,600	0.0
Channel	197-66VT2PRIB	VT2PRIB, LL	60.4	97	13.9	57.8	12,197	3.1
NuTech/G2 Genetics	5H-905	HX, RR2, LL	59.5	105	14.0	57.0	11,471	0.0
Mycogen	X14402S3	Experimental	58.4	99	13.2	57.8	11,035	0.0
NuTech/G2 Genetics	5F-008	AM, RR2, LL	53.9	108	13.9	58.6	10,237	0.0
Average			67.0	102	13.6	57.2	11,140	1.2

^aTechnology trait designations: AM=Optimum AcreMax; DG=Genuity DroughtGard; HX=Herculex 1; HXT=Herculex XTRA; INT=Optimum Intrasect; LL=LibertyLink; RR2=Roundup Ready 2; VT2PRIB=Genuity VecTran Double Protection Refuge in the Bag Complete.

^bYields corrected to 15.5% moisture.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

Yield trial data could not be interpreted due to the high degree of field variability. The yield results should not be used by farmers for selecting superior hybrids for planting.

Site Information

Collaborators: USDA-ARS Central Great Plains Research Station
 Planting Date: 5/19/2014
 Harvest Date: 11/7/2014
 Fertilizer: Nitrogen at 60 lb/ac
 Herbicide: Lumax and Roundup applied before emergence
 Soil Type: Rago Silt Loam

Evaluation of Drought Tolerant Corn Yield Performance at Different Plant Densities in Dryland Conditions

Summary:

Above-average precipitation and mild temperature during the 2014 growing season created great conditions for testing drought tolerant hybrids. Exceptionally good weather conditions led to a yield of 115 bushels per acre at Akron. The trial at Dailey was not harvested due to a severe hail storm that destroyed the trial on June 19. Planting density had a major impact on grain yield at Akron. There was not a statistical difference in yield among the hybrids or between the traditional or drought tolerant groups of hybrids. Test weights were the same regardless of the planting population but they were significantly different among the eight hybrids. It should be noted that these results are from a single year and that results from multiple years and multiple locations are necessary to draw meaningful conclusions.

Introduction:

Akron and Dailey Colorado tend to have warm and dry weather during the summer with poorly timed rainfall, restricting the yield potential of dryland corn. There are often true drought conditions at these trial locations. Drought tolerant corn hybrids that are adapted to the region are needed to help increase yield potential and to help reduce yield losses due to drought.

The purpose of our study was to:

1. Assess the performance of drought tolerant corn hybrids relative to checks under dryland management in low rainfall environments.
2. Assess plant density response of drought tolerant hybrids compared to checks under dryland management in low rainfall environments.

Approach:

We tested two check hybrids and two drought tolerant hybrids from each company (NuTech and Channel) for a total of eight hybrids (NuTech: 5X698, 5F200, 5H502, 5F399; Channel: 198-00, 201-00, 197-31, and 201-37). The hybrids were seeded at three different rates (8, 17, and 25 thousand seeds/ac) at both locations. All hybrids were within the 97-102 CRM

range and are adapted for production in the western United States. Trials were planted using a four-row cone planter with 30-inch row spacing. Plots were 10 feet wide by 30 feet long. All treatments were replicated four times at each location. Stand counts were taken during early growth (V-5). Lodging and ear-height counts were taken at Akron at harvest. Grain yield was adjusted to 15.5% grain moisture content. Statistical analyses were performed using the SAS program.

Dailey, CO

The rainfed study was planted on a Haxtun sandy loam soil one mile west of Dailey. The soil pH was 7.0 and the organic matter content was 2.2%. The average annual precipitation amount is 17.5 inches. The previous crop was winter wheat and the site was managed as a dryland minimum-till cropping system. The trial was planted on May 21, 2014. A starter fertilizer was applied at planting at a rate of 18 and 48 lb/ac each of nitrogen and phosphorus. Composted manure was applied to the site prior to planting at a rate of 1.5 tons/ac. Roundup PowerMax (glyphosate), Laudis (tembotrione), and atrazine herbicides were applied early in the growing season for weed control.

Akron, CO

The study was planted on a Rago silt loam soil at the USDA Central Great Plains Research Station at Akron. The soil has an average pH of 7.2 and an organic matter content of 2.3%. The average annual precipitation amount is 16.5 inches. The previous crop was winter wheat and the site was managed as a dryland no-till cropping system. The trial was planted on May 19, 2014. Nitrogen was applied as a dry urea after planting at a rate of 60 lb/ac. Lumax herbicide was applied on May 22 at a rate of 2 qt/ac. The trial was harvested on November 6, 2014 using a modified Case IH plot combine equipped with a Harvest Master grain weighing system to collect grain weight, moisture content, and test weight data.

Results and Discussion:

Yields at Akron affected by weather conditions

The overall yield level was much higher in 2014 (115 bu/ac) than the long-term average (40 bu/ac) due to the timely rainfall (especially during flowering and grain fill) and mild

temperatures. There was only one day where the daily high temperature was over 100 degrees Fahrenheit from the planting to harvest dates this year whereas there are normally many days over 100°. The total rainfall during the growing season (planting to harvest) was 16.4 inches compared to the long-term average of 12.1 inches during the growing season. The trial had consistent and good stands.

Yield Results

Table 1 shows the average yield results for the eight different hybrids within the two hybrid groupings –drought tolerant and traditional hybrids at Akron. The plant density treatments affected the grain yield when averaged across all eight hybrids. All of the hybrids yielded a lot less (85.1 bu/ac) at the 8,000 seeds/ac plant density than at plant densities of 17 and 25 thousand seeds/ac (128.1 and 127.6 bu/ac, respectively). Specific hybrids that yielded significantly lower at the 8,000 seeds/ac rate than the two higher plant densities were 197-31 and 201-37 (traditional), and 201-00 (drought tolerant).

There was no difference among hybrids and likewise, there was no difference between drought resistant (117.1 bu/a) and the traditional check (112.6 bu/ac) hybrids. Although the drought tolerant hybrids yielded higher than the check hybrids at the lowest and highest plant densities, the yields were not statistically different from each other at any of the three rates.

Test Weight Results

Table 1 shows the average test weights of the eight hybrids among the three plant densities at Akron. There was a very significant difference among the eight hybrid test weights, with the 201-00 and 197-31 hybrids having the highest test weights (58.9 and 58.5 lb/bu, respectively). The traditional and check hybrid groups did not differ in test weights, with both groups averaging 57.3 lb/bu. The hybrid test weights were not affected by the plant density treatments.

Conclusions:

The drought tolerant hybrids and traditional check hybrids were not different for yield or test weight. There was no difference in yield due to plant density. The hybrid yield was affected by plant density due to low yield at the lowest (8,000 seeds/ac) plant density treatment.

Individual hybrid test weights differed, although there was not a difference between the drought

tolerant or traditional hybrid groups. We will repeat the trials again next year at the same two dryland locations to compare the hybrids in the drought tolerant and traditional check groups since we did not get adequate drought conditions (stress) at Akron this year and we lost the trial at Dailey. We may increase the spread of the plant density treatments (or add more plant densities) to ensure the plants in the highest plant density treatment are stressed, even with average or above-average rainfall during the growing season. We greatly appreciate the funding and support from the Colorado Corn Growers Association to conduct these trials.

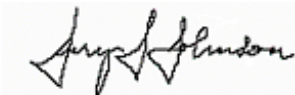
Table 1. 2014 average grain yield and test weight across the hybrid and plant density treatments at Akron, CO.

Hybrid	Yield				Test Weight			
	Plant Density (seeds/acre)				Plant Density (seeds/acre)			
	8,000	17,000	25,000	Average	8,000	17,000	25,000	Average
	bu/ac				lb/ac			
<u>Drought Tolerant</u>	88.5	127.9	131.2	117.1	57.4	57.3	57.3	57.3
5F200	103.7	133.9	136.9	124.9	56.9	57.3	57.3	57.2
5X698	95.1	119.4	140.5	120.4	56.2	56.3	56.0	56.1
198-00	82.6	143.6	119.9	115.4	56.9	57.3	56.9	57.0
201-00	69.6	114.7	127.6	107.1	59.5	58.4	59.0	58.9
<u>Traditional</u>	81.8	128.2	124.0	112.6	57.3	57.5	57.2	57.3
5F399	96.1	127.7	142.8	122.2	57.1	56.3	56.3	56.6
197-31	58.1	128.1	126.9	113.6	58.9	58.8	57.9	58.5
201-37	80.0	126.2	127.0	111.1	55.2	57.8	57.5	56.8
5H502	81.0	130.9	99.2	103.7	58.4	57.1	57.2	57.6
Average	85.1	128.1	127.6	114.8	57.4	57.4	57.2	57.3

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