Plant Factors Related to Ear Size in Maize Grown at Different Densities

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Introduction

The creation and maintenance of growth and developmental homogeneity among plants within a maize stand may contribute to higher average perplant grain yield. A number of studies have shown that plant-to-plant growth and developmental uniformity is strongly associated with greater yield in maize, though cause-and-effect have not been clearly established.

Corn ears are not uniform in size even in uniform stands, and it is not known how and when such differences in ear size develop. Not only do we not know what factors might lead to non-uniformity; we also have not discovered how to render ear size more uniform. Plants at lower density are posted as having more uniform ears, but this has not been shown clearly. It is also not known if different hybrids might differ in ear size uniformity.

Study Design and Sites

- A split plot design, with plant density assigned to main plots, and hybrid to sub-plots
- RRBD arrangement of treatments with two replications
- The study was conducted in 2014 at Urbana and St. Peter in east and south central Illinois, respectively. Only the Urbana results will be discussed here.
- Plots consisted of four 76-cm rows, 7 m long

Materials and Methods

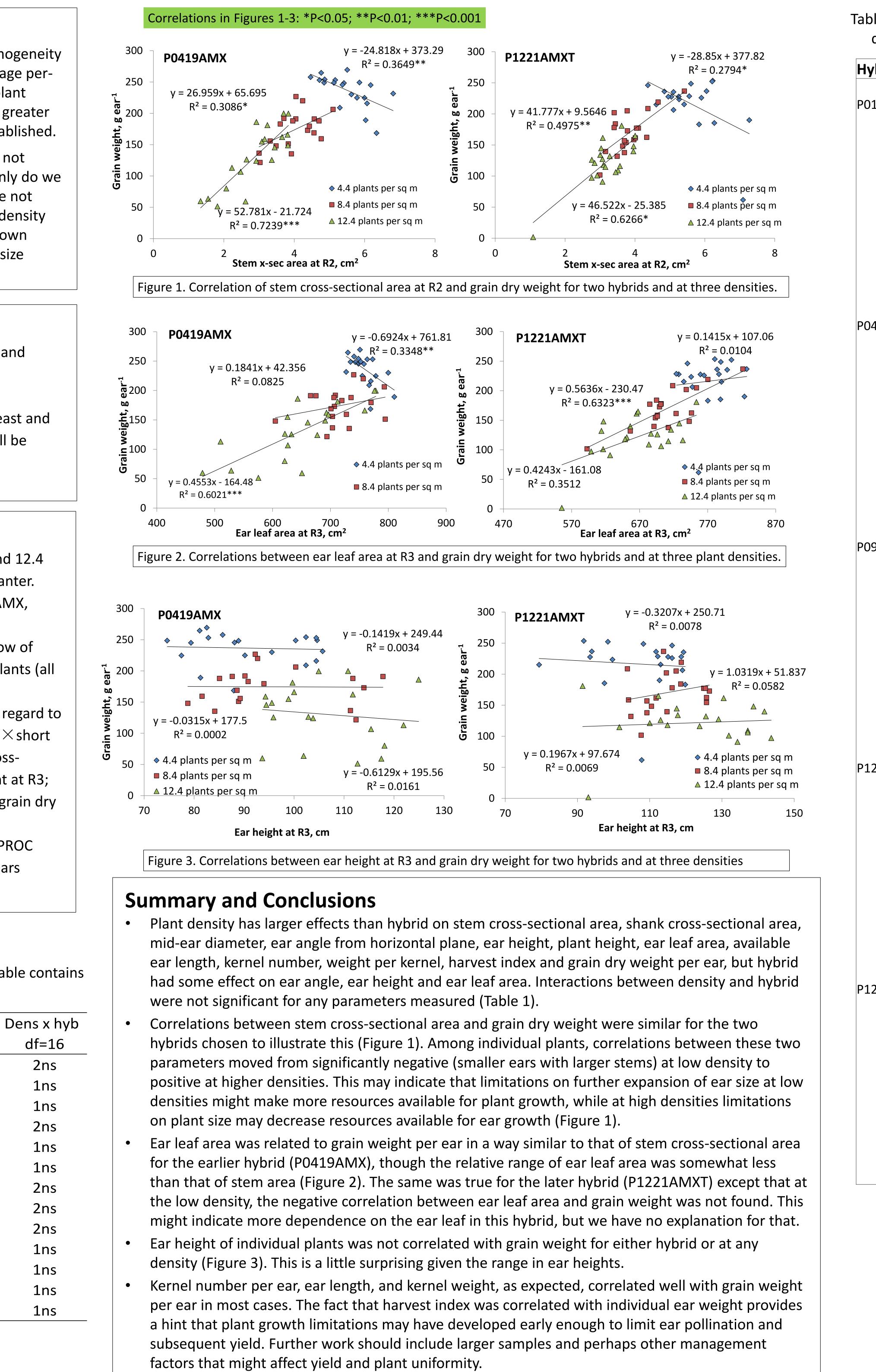
- Main plots consisted of 5 plant densities: 4.4, 6.4, 8.4, 10.4, and 12.4 plants m⁻². Plots were planted to stand with an Almaco plot planter.
- To subplots were assigned 5 DuPont Pioneer[®] hybrids: P0157AMX, P0419AMX, P0909CHR, P1221AMXT, P1257AMX.
- Ten consecutive and representative plants from each border row of plots were selected at V1 and tagged for evaluation. The ten plants (all aerial part) were harvested by hand individually at R6.
- Individual plant measurements included: leaf orientation with regard to row direction by compass; stem cross-sectional area (long axis \times short axis \times 0.7854) at V9 and R2; mid-ear diameter at R2; shank crosssectional area at R2; ear angle from horizontal at R3; ear height at R3; plant height at R3; ear leaf area (length \times width \times 0.75) at R3; grain dry weight per ear at R6; and plant dry weight at R6.
- Analysis of variance was conducted for each hybrid using SAS PROC MIXED and correlations among parameters for the 20 plants/ears conducted in Microsoft Excel

Results

Table 1. ANOVA of parameters for main effects and interactions. Table contains F values; *Pr>F \leq 0.05; **Pr>F \leq 0.01.

	Density	Hybrid
Parameter	df=4	df=4
Stem x-sec area at V9	169**	4ns
Stem x-sec area at R2	157**	11ns
Shank x-sec area at R2	110**	5ns
Mid-ear diameter at R2	35**	6ns
Ear angle from horizontal	9**	69**
Ear height at R3	4*	51*
Plant height at R3	46**	4ns
Ear leaf area at R3	35**	450**
Available ear length at R6	94**	5ns
Kernel number per ear at R6	65**	6ns
Weight per kernel	50**	4ns
Harvest index	7*	2ns
Grain dry weight per ear	99**	4ns

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Table 2. Correlation coefficients by plant density and hybrid between different parameters and grain dry weight n=20 plants

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Weight per kernel Harvest index 0.12 0.70 0.64 0.49 0909CHR Stem x-sec area at V9 0.83 -0.49 0.30 0909CHR Stem x-sec area at R2 0.45 0.54 0.77 0.82 Shank x-sec area at R2 0.45 0.54 0.77 0.82 Shank x-sec area at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.53 0.57 0.43 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Stem x-sec area at R2 -0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Stem x-sec area at R2 -0.27 0.11 0.25		Available ear length at R6	0.71	0.43	0.93	0.76	0.9	
Harvest index 0.83 -0.49 0.49 0.30 D909CHR Stem x-sec area at V9 0.52 0.63 0.80 Stem x-sec area at R2 0.45 0.54 0.77 0.82 Shank x-sec area at R2 0.54 0.66 0.73 0.82 Mid-ear diameter at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.51 -0.19 0.29 0.52 Available ear length at R6 0.84 0.88 0.86 0.88 Kernel number per ear at R2 0.51 0.49 0.82 0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.43 0.84 Mid-ear diameter at R2 -0.12 0.51 0.51 0.84 Stem x-sec area at R2 -0.27 0.11 0.25 0.64 Ear height at R3 0.22 0.28 0.30		Kernel number per ear at R6	0.86	0.20	0.80	0.81	0.9	
Harvest index 0.83 -0.49 0.49 0.30 D909CHR Stem x-sec area at V9 0.52 0.63 0.80 Stem x-sec area at R2 0.54 0.65 0.77 0.82 Shank x-sec area at R2 0.84 0.66 0.73 0.82 Mid-ear diameter at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.81 0.15 0.74 0.83 Ear angle from horizontal at R3 0.51 -0.19 0.29 -0.32 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 -0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.12 0.51 0.51 0.84 Stem x-sec area at R2 -0.10 0.24 <		•	0.12	0.70	0.64	0.49	0.7	
Stem x-sec area at R2 0.45 0.54 0.77 0.82 Shank x-sec area at R2 0.54 0.66 0.73 0.82 Mid-ear diameter at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.51 0.15 0.74 0.83 Ear angle from horizontal at R3 0.51 0.19 0.29 -0.32 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.43 0.84 Mid-ear diameter at R2 -0.12 0.51 0.54 0.64 Ear height at R3 -0.09 0.10 0.24 0.37 Plant height at R3 -0.52 -0.09 -0.32 0.66 <td></td> <td>Harvest index</td> <td>0.83</td> <td>-0.49</td> <td>0.49</td> <td>0.30</td> <td>0.6</td>		Harvest index	0.83	-0.49	0.49	0.30	0.6	
Stem x-sec area at R2 0.45 0.54 0.77 0.82 Shank x-sec area at R2 0.54 0.66 0.73 0.82 Mid-ear diameter at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.81 0.15 0.74 0.83 Ear angle from horizontal at R3 -0.11 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.57 0.71 0.82 1221AMXT Stem x-sec area at R2 -0.53 0.57 0.71 0.84 Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Shank x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.24 0.37 Shank x-sec area at R2 -0.50 0.57								
Shank x-sec area at R2 0.54 0.66 0.73 0.82 Mid-ear diameter at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.81 0.15 0.74 0.83 Ear angle from horizontal at R3 0.51 -0.19 0.29 -0.32 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at R2 -0.53 0.57 0.43 0.84 Stem x-sec area at R2 -0.12 0.51 0.84 0.86 Mid-ear diameter at R2 -0.12 0.51 0.84 0.84 Mid-ear diameter at R2 -0.22 0.57 0.43 0.84 Mid-ear diameter at R2 -0.12 0.51 0.84 Mid-ear diameter at R2 -0.22 0.10 0.24	0909CHR						0.2	
Mid-ear diameter at R2 0.80 0.48 0.83 0.62 Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.81 0.15 0.74 0.83 Ear angle from horizontal at R3 0.51 -0.19 0.29 -0.32 Ear leaf area at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.88 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at R2 -0.53 0.57 0.43 0.84 Stem x-sec area at R2 -0.22 0.51 0.51 0.84 Mid-ear diameter at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.22 0.37 Plant height at R3 0.09 0.10 0.24 0.37 Plant height at R3 0.22 0.28 0.31<							0.5	
Ear height at R3 0.77 0.10 -0.11 -0.09 Plant height at R3 0.81 0.15 0.74 0.83 Ear angle from horizontal at R3 -0.51 -0.19 0.29 -0.32 Ear leaf area at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Stank x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Ear height at R3 -0.09 0.10 0.24 0.37 Plant height at R3 -0.22 0.28 0.31 0.66 Ear aleaf area at R3 0.10 0.47 0.80 0.70 Available ear length at R3 0.22 0.28 <t< td=""><td rowspan="3"></td><td>Shank x-sec area at R2</td><td>0.54</td><td>0.66</td><td>0.73</td><td>0.82</td><td>0.6</td></t<>		Shank x-sec area at R2	0.54	0.66	0.73	0.82	0.6	
Plant height at R3 0.81 0.15 0.74 0.83 Ear angle from horizontal at R3 -0.51 -0.19 0.29 -0.32 Ear leaf area at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Shank x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Ear height at R3 -0.09 0.10 0.24 0.37 Plant height at R3 -0.22 0.28 0.31 0.66 Ear angle from horizontal at R3 -0.52 -0.09 -0.32 -0.46 Ear angle from horizontal at R3 -0.52 -0.09 -0.32 -0.46 Ear angle from horizontal at R3 <		Mid-ear diameter at R2	0.80	0.48	0.83	0.62	0.5	
Ear angle from horizontal at R3 -0.51 -0.19 0.29 -0.32 Ear leaf area at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Ear height at R3 0.02 0.28 0.31 0.66 Ear angle from horizontal at R3 -0.52 -0.09 -0.32 -0.43 Plant height at R3 0.10 0.47 0.80 0.70 Available ear length at R6 0.87 0.58 0.90 0.90 Kernel number per ear at R6 0.87 0.58 0.59 0.43 0.84 Weight per kernel 0.		Ear height at R3	0.77	0.10	-0.11	-0.09	0.2	
Ear leaf area at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Shank x-sec area at R2 -0.12 0.51 0.84 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.66 Ear height at R3 0.00 0.10 0.24 0.37 Plant height at R3 -0.52 -0.09 -0.32 -0.46 Ear leaf area at R3 0.10 0.47 0.80 0.70 Available ear length at R6 0.87 0.32 0.80 0.91 Weight per kernel 0.81 0.16 0.58 0.59 Harvest index 0.83 -0.09 0.66 <t< td=""><td></td><td>Plant height at R3</td><td>0.81</td><td>0.15</td><td>0.74</td><td>0.83</td><td>0.2</td></t<>		Plant height at R3	0.81	0.15	0.74	0.83	0.2	
Ear leaf area at R3 0.71 0.49 0.67 0.72 Available ear length at R6 0.84 0.88 0.86 0.86 Kernel number per ear at R6 0.92 0.78 0.88 0.91 Weight per kernel 0.59 0.04 0.88 -0.07 Harvest index 0.63 0.65 0.76 0.82 1221AMXT Stem x-sec area at V9 -0.32 0.57 0.43 0.84 Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Shank x-sec area at R2 -0.12 0.51 0.84 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.66 Ear height at R3 0.00 0.10 0.24 0.37 Plant height at R3 -0.52 -0.09 -0.32 -0.46 Ear leaf area at R3 0.10 0.47 0.80 0.70 Available ear length at R6 0.87 0.32 0.80 0.91 Weight per kernel 0.81 0.16 0.58 0.59 Harvest index 0.83 -0.09 0.66 <t< td=""><td rowspan="6"></td><td>Ear angle from horizontal at R3</td><td>-0.51</td><td>-0.19</td><td>0.29</td><td>-0.32</td><td>-0.0</td></t<>		Ear angle from horizontal at R3	-0.51	-0.19	0.29	-0.32	-0.0	
Available ear length at R6 Kernel number per ear at R6 Weight per kernel Harvest index0.840.880.860.861221AMXTStem x-sec area at V9 Stem x-sec area at R2 Anid-ear diameter at R2 Plant height at R3 Ear leaf area at R3 Available ear length at R6-0.320.570.430.841257AMXStem x-sec area at V9 Stem x-sec area at R2 Available ear length at R3 Ear height at R3-0.220.280.310.661257AMXStem x-sec area at R2 Brank x-sec area at R2 		U	0.71	0.49	0.67	0.72	0.4	
Kernel number per ear at R6 Weight per kernel Harvest index0.920.780.880.911221AMXTStem x-sec area at V9 Stem x-sec area at R2 Anid-ear diameter at R2 Ear height at R3 Harvest index-0.320.570.430.841221AMXTStem x-sec area at R2 Shank x-sec area at R2 Hid-ear diameter at R2 Ear height at R3 Harvest index-0.320.570.430.841221AMXTStem x-sec area at R2 Shank x-sec area at R2 Hid-ear diameter at R2 Ear height at R3 Hant height at R3 Harvest index-0.270.110.250.641257AMXStem x-sec area at V9 Kernel number per ear at R6 Weight per kernel Harvest index0.490.400.500.731257AMXStem x-sec area at V9 Stem x-sec area at R2 Harvest index0.490.400.500.731257AMXStem x-sec area at V9 Stem x-sec area at R2 Harvest index0.430.080.700.341257AMXStem x-sec area at V9 Stem x-sec area at R2 Harvest index0.430.080.700.341257AMXStem x-sec area at V9 Stem x-sec area at R2 Harvest index0.430.080.700.341257AMXStem x-sec area at R2 Harvest index0.430.080.700.341257AMXStem x-sec area at R2 Harvest index0.430.080.700.341257AMXStem x-sec area at R2 Harvest index0.540.570.821257AMXStem x-sec area at R2 Harvest index0.430.080.700.34 <tr< td=""><td></td><td></td><td></td><td></td><td></td><td>0.8</td></tr<>							0.8	
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Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Shank x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Ear height at R3 -0.09 0.10 0.24 0.37 Plant height at R3 0.22 0.28 0.31 0.66 Ear angle from horizontal at R3 -0.52 -0.09 -0.32 -0.46 Ear leaf area at R3 0.10 0.47 0.80 0.70 Available ear length at R6 0.87 0.58 0.90 0.90 Kernel number per ear at R6 0.87 0.32 0.80 0.91 Weight per kernel 0.81 0.16 0.58 0.59 Harvest index 0.83 -0.09 0.66 0.76 1257AMX Stem x-sec area at R2 0.62 0.25 0.58 0.73 Stem x-sec area at R2 0.62 0.25 0.58 0.73 Stem x-sec area at R2 0.64 0.45 0.57 0.82 Mid-ear diameter at R2 0.43 0.80							0.8	
Stem x-sec area at R2 -0.53 0.57 0.71 0.87 Shank x-sec area at R2 -0.12 0.51 0.51 0.84 Mid-ear diameter at R2 -0.27 0.11 0.25 0.64 Ear height at R3 -0.09 0.10 0.24 0.37 Plant height at R3 0.22 0.28 0.31 0.66 Ear angle from horizontal at R3 -0.52 -0.09 -0.32 -0.46 Ear leaf area at R3 0.10 0.47 0.80 0.70 Available ear length at R6 0.87 0.58 0.90 0.90 Kernel number per ear at R6 0.87 0.32 0.80 0.91 Weight per kernel 0.81 0.16 0.58 0.59 Harvest index 0.83 -0.09 0.66 0.76 1257AMX Stem x-sec area at R2 0.62 0.25 0.58 0.73 Stem x-sec area at R2 0.62 0.25 0.58 0.73 Stem x-sec area at R2 0.64 0.45 0.57 0.82 Mid-ear diameter at R2 0.43 0.80								
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Ear height at R3-0.090.100.240.37Plant height at R30.220.280.310.66Ear angle from horizontal at R3-0.52-0.09-0.32-0.46Ear leaf area at R30.100.470.800.70Available ear length at R60.870.580.900.90Kernel number per ear at R60.870.320.800.91Weight per kernel0.810.160.580.59Harvest index0.83-0.090.660.761257AMXStem x-sec area at V90.490.400.500.73Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Shank x-sec area at R2	-0.12	0.51	0.51	0.84	0.5	
Plant height at R3 0.22 0.28 0.31 0.66 Ear angle from horizontal at R3 -0.52 -0.09 -0.32 -0.46 Ear leaf area at R3 0.10 0.47 0.80 0.70 Available ear length at R6 0.87 0.58 0.90 0.90 Kernel number per ear at R6 0.87 0.32 0.80 0.91 Weight per kernel 0.81 0.16 0.58 0.59 Harvest index 0.83 -0.09 0.66 0.76 1257AMX Stem x-sec area at V9 0.49 0.40 0.50 0.73 Stem x-sec area at R2 0.62 0.25 0.58 0.73 Shank x-sec area at R2 0.64 0.45 0.57 0.82 Mid-ear diameter at R2 0.43 0.08 0.70 0.34 Ear height at R3 0.14 0.29 0.37 -0.42 Plant height at R3 0.37 0.50 0.51 -0.03 Ear angle from horizontal at R3 0.069 0.65 0.66 0.60 Available ear length at R6 0.93 0.92		Mid-ear diameter at R2	-0.27	0.11	0.25	0.64	0.7	
Ear angle from horizontal at R3 Ear leaf area at R3-0.52-0.09-0.32-0.46Available ear length at R6 Kernel number per ear at R60.870.580.900.90Weight per kernel Harvest index0.810.160.580.591257AMXStem x-sec area at V9 Stem x-sec area at R20.490.400.500.73Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.840.92Weight per kernel0.220.700.680.71		Ear height at R3	-0.09	0.10	0.24	0.37	-0.4	
Ear leaf area at R30.100.470.800.70Available ear length at R60.870.580.900.90Kernel number per ear at R60.870.320.800.91Weight per kernel0.810.160.580.59Harvest index0.83-0.090.660.761257AMXStem x-sec area at V90.490.400.500.73Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Plant height at R3	0.22	0.28	0.31	0.66	-0.1	
Ear leaf area at R30.100.470.800.70Available ear length at R60.870.580.900.90Kernel number per ear at R60.870.320.800.91Weight per kernel0.810.160.580.59Harvest index0.83-0.090.660.761257AMXStem x-sec area at V90.490.400.500.73Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Ear angle from horizontal at R3	-0.52	-0.09	-0.32	-0.46	-0.1	
Kernel number per ear at R6 Weight per kernel Harvest index0.870.320.800.911257AMXStem x-sec area at V9 Stem x-sec area at R2 Shank x-sec area at R2 Mid-ear diameter at R20.490.400.500.73Mid-ear diameter at R2 Plant height at R3 Ear angle from horizontal at R3 Ear leaf area at R3 Available ear length at R6 Kernel number per ear at R60.430.080.700.340.540.140.290.37-0.420.370.500.51-0.030.540.550.510.510.530.51-0.03-0.550.51-0.030.540.550.560.660.600.51-0.550.51-0.03-0.55-0.030.540.550.550.510.51-0.03-0.55-0.01-0.55-0.030.550.560.660.600.690.650.660.60-0.550.540.920.930.920.850.92-0.550.550.560.660.600.660.60-0.550.560.660.690.960.860.840.92Weight per kernel0.220.700.680.77		Ear leaf area at R3	0.10	0.47	0.80	0.70	0.3	
Kernel number per ear at R6 Weight per kernel Harvest index0.870.320.800.911257AMXStem x-sec area at V9 Stem x-sec area at R2 Shank x-sec area at R2 Mid-ear diameter at R20.490.400.500.73Mid-ear diameter at R2 Plant height at R3 Ear angle from horizontal at R3 Ear leaf area at R3 Available ear length at R6 Kernel number per ear at R60.430.080.700.340.540.140.290.37-0.420.370.500.51-0.030.540.550.510.510.530.51-0.03-0.550.51-0.030.540.550.560.660.600.51-0.550.51-0.03-0.55-0.030.540.550.550.510.51-0.03-0.55-0.01-0.55-0.030.550.560.660.600.690.650.660.60-0.550.540.920.930.920.850.92-0.550.550.560.660.600.660.60-0.550.560.660.690.960.860.840.92Weight per kernel0.220.700.680.77		Available ear length at R6	0.87	0.58	0.90	0.90	0.8	
Weight per kernel Harvest index0.810.160.580.591257AMXStem x-sec area at V90.490.400.500.73Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		U					0.8	
Harvest index0.83-0.090.660.761257AMXStem x-sec area at V90.490.400.500.73Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		•					0.6	
Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77							0.6	
Stem x-sec area at R20.620.250.580.73Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77								
Shank x-sec area at R20.540.450.570.82Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77	1257AMX						0.6	
Mid-ear diameter at R20.430.080.700.34Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77							0.7	
Ear height at R30.140.290.37-0.42Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Shank x-sec area at R2	0.54	0.45	0.57	0.82	0.7	
Plant height at R30.370.500.51-0.03Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Mid-ear diameter at R2	0.43	0.08	0.70	0.34	0.8	
Ear angle from horizontal at R3-0.01-0.53-0.01-0.55Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Ear height at R3	0.14	0.29	0.37	-0.42	0.0	
Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Plant height at R3	0.37	0.50	0.51	-0.03	0.6	
Ear leaf area at R30.690.650.660.60Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		Ear angle from horizontal at R3	-0.01	-0.53	-0.01	-0.55	0.0	
Available ear length at R60.930.920.850.92Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77		6					0.8	
Kernel number per ear at R60.960.860.840.92Weight per kernel0.220.700.680.77							0.9	
Weight per kernel 0.22 0.70 0.68 0.77		U					0.9	
		•					0.7	
							0.8	
				e i de l	2.00	5.7.5		
Colors denote P<0.05 P<0.01 P<0.001		Colors denote	P<0	05 <mark>P<</mark>	0.01 P	<0.001		

Colors denote significance: No color = NS at p=0.05