

Multi-Hybrid Planting for Corn Hybrid Placement

Study ID: 108155201703

County: Saunders

Soil Type: Filbert silt loam; Fillmore silt loam; Scott silt loam; Tomek silt loam; Yutan silty clay loam

Planting Date: 4/25/17

Harvest Date: 10/31/17

Population: 28,000

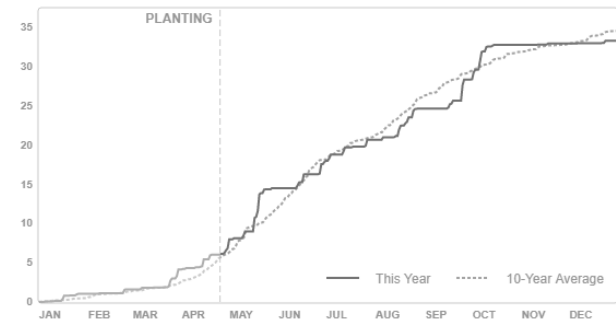
Row Spacing (in): 30

Previous Crop: Soybean

Tillage: No-Till

Irrigation: None

Rainfall (in):



Introduction: Using a multi-hybrid planter, hybrids can theoretically be placed to optimize production in stable management zones. This study compares two contrasting hybrids, one with a drought tolerant trait and one geared towards high production, placed in defined management zones (*Figure 1*).

- The drought tolerant/**defensive hybrid**, P1498AM, was placed in portions of the field that typically had lower water retention (dark grey).
- The **offensive hybrid**, P1257AM, was placed in portions of the field that normally maintained adequate moisture across the growing season (light grey).
- Check strips of the opposing hybrid were placed in each zone as shown in *Figure 1*.

Management Zone Creation: Five years of yield data were used for clustering in Management Zone Analyst Version 1.0 (USDA-ARS, University of Missouri, Columbia, MO).



Figure 1. Management zones for defensive hybrid (dark grey), and offensive hybrid (light grey) with check strips of the opposing hybrid.

Results: Within each zone, success of the offensive and defensive hybrid was evaluated by comparing the yield of the check strips to the yield in an adjacent strip of the hybrid assigned to that zone. Data were analyzed using the GLIMMIX procedure in SAS 9.4 (SAS Institute Inc., Cary, NC). Mean separation for hybrids within a zone was performed with Fisher's LSD. Letters below apply for differences within a zone.

Treatment	Pioneer 1498AM (defensive hybrid)	Pioneer 1257AM (offensive hybrid)	P-Value
<i>Yield (bu/ac) †</i>			
Defensive Zone	175 A*	139 B	0.0003
Offensive Zone	203 A	165 B	0.0001
<i>Marginal Net Return (\$/ac)‡</i>			
Defensive Zone	478.10	356.31	
Offensive Zone	566.61	440.25	

*Values with the same letter are not significantly different at a 95% confidence interval. Letters apply within zone.

†Bushels per acre corrected to 15.5% moisture.

‡Net return calculated using \$3.20/bu corn and seed costs of \$233/bag for Pioneer 1498AM and \$252/bag for Pioneer 1257AM.

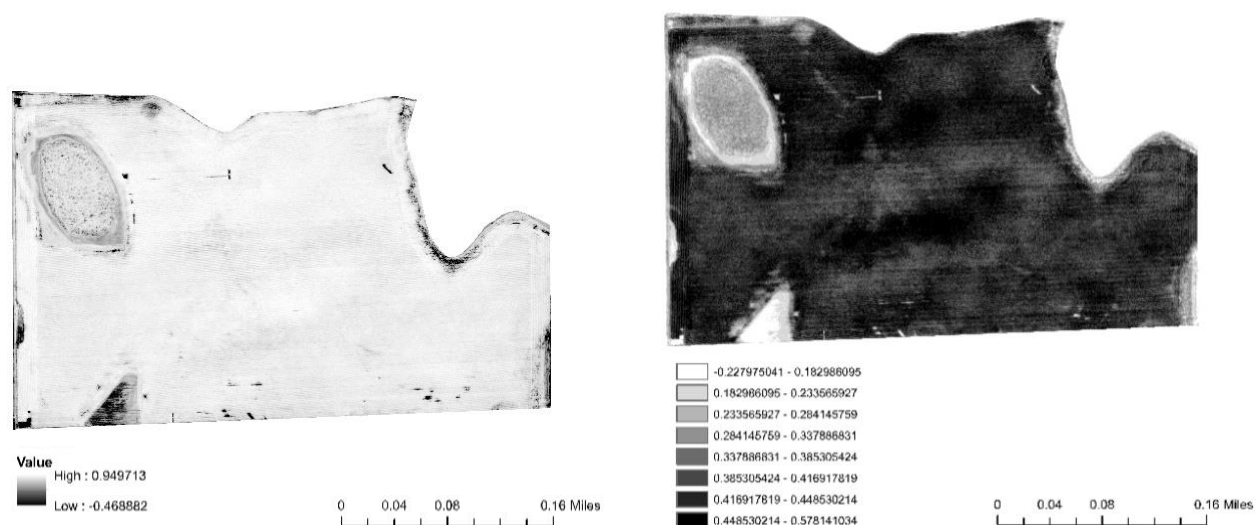


Figure 2. NDVI (left) and NDRE (right) imagery of the field area.

Aerial imagery was obtained in mid-July (Figure 2). Despite large yield differences between the two hybrids tested, very few differences were observed in NDVI (normalized difference vegetative index) or NDRE (normalized difference red edge) imagery.

Summary: In both the offensive and defensive zones, the offensive hybrid, P1257AM, yielded significantly lower than the defensive hybrid, P1498AM. In previous multi-hybrid research, P1257AM has outperformed P1498AM in a variety of field settings; therefore, the results of this year's study were unexpected.

While it is not known why P1257AM was lower yielding, temperatures at pollination may have contributed. Based on GDD accumulated at the field site, P1257AM was silking on July 16. During this time frame, temperatures were above 90°F, potentially inhibiting silking and pollination. Based on GDD accumulation, P1498AM was silking on July 14. For a three-day window between July 13 and 15, temperatures did not reach 90° F, potentially providing more favorable conditions for silking and pollination. The drastic yield difference between the two hybrids appears to be uniform across the field. This could also point to a uniform weather event that had a greater impact on P1257AM. Wind was also an issue at this field resulting in dropped ears and may be a contributing factor in yield results.

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