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### **Do We Need Dedicated Maize Varieties for Perennial Groundcover Systems? \***

#### **Abstract**

When maize is cultivated in perennial ground cover (PGC) systems, we face challenges related to competition between cash and cover crops for light, nutrients, and water. Understanding how different maize hybrids respond to these conditions, as well as the interactions between genotypes (G), environment (E), and management (M), is critical for optimizing yield and ensuring long-term sustainability. Our experiments address the question of whether dedicated breeding of maize hybrids suitable for PGC systems is needed.

We screened 69 experimental hybrids (ISU) and 2 Corteva check hybrids to explore ranking differences for grain yield under conventional versus perennial ground cover (PGC) systems. Experiments were conducted with two perennial ground cover species (untreated (mowed)), Kentucky Bluegrass (KBG) and *Poa bulbosa* (PB), near Ames. The ranking of our hybrids for maize grain yield and plant height was substantially different under conventional and PGC conditions.

However, our trials are very limited in the number of environments and, at best, preliminary. To develop maize suitable for PGC systems, breeders should prioritize selecting genotypes/hybrids based on performance in PGC environments rather than conventional ones, focusing on grain yield. Our KBG PGC system reflects the worst-case scenario: treatments to suppress the PGC failed, and corn competes with green PGC.

In this situation, there would be a need to breed specifically for at least KBG systems, as performance in conventional environments may not reliably predict performance in “green PGC.” However, summer dormant and during summer “brown” PGC like PB (or treated KBG) appeared more promising and similar to conventional experiments.